

# Radio Control CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

## R/C RACING REVOLUTION!

**TA03** TAMIYA REINVENTS THE PARKING LOT RACER

tested



Yokomo Hot Dog 4

Trinity GM-VIS Cells

Thunder Tiger Mirage Pro

HOW  
TO  
Install  
electronics



Make your car  
stronger & lighter

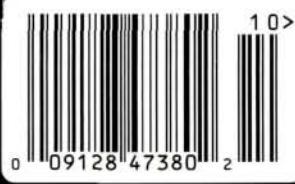
Balance your chassis

Protect  
your  
graphite  
parts

USA \$4.95

CANADA \$5.95

10>



47380

Tricked Treat  
Homebuilt Ghoul  
Cycle—page 80

October 1996



plus

Tuning  
secrets,  
for Associated's  
RC10GT

**DEPARTMENTS**

- 6 Editorial**
- 8 Letters**
- 20 Readers' Rides**
- 44 What's New**
- 130 Grassroots Racing**
- 176 Index of Manufacturers**
- 176 Index of Advertisers**
- 177 Classified Ads**

**COLUMNS**

- 17 Inside Scoop**  
by Chris Chianelli
- 27 Pit Tips**  
by Jim Newman
- 32 Troubleshooting**  
by George M. Gonzalez
- 38 Getting Started**  
by Brian Leslie
- 41 Scoping Out**  
by John Rist
- 46 R/C Doctor**  
by Doug Mertes
- 186 Chris's Back Lot**  
by Chris Chianelli

**THRASH TESTS**

- 48 Tamiya TA03F-Pro**  
A racing machine from the originators of the touring car  
by Frank Masi
- 56 Thunder Tiger Mirage Pro**  
1/8-scale buggy performance at a bargain price  
by A.R. Flatbush
- 62 Yokomo Hot Dog 4**  
Foot-long 4WD buggy  
by Wendy Matsuda

ON THE COVER (clockwise from top): the Two-Wheel Terror (photo by Dave Ditner); the Tamiya TA03F-Pro (photo by Walter Sidas); how to install your electronics (photo by Stan VanDuff); the Thunder Tiger Mirage Pro (photo by A.R. Flatbush).

THIS PAGE: "Back Lot" mayhem (illustration by Scott Angle); the Tamiya TA03F-Pro (photo by Walter Sidas); racing action from the IFMAR On-Road Worlds Warm-Up Race (photo by Dan Haas).

# Radio Control **CAR ACTION**

VOLUME 11, NUMBER 10 • OCTOBER 1996

## features

- 67 Tamiya Kakegawa Circuit Grand Opening**  
How it's done in Japan  
by Frank Masi
- 70 How to: Use Scales to Tweak Your Chassis**  
NASCAR technology scaled down  
by Brian Leslie
- 76 New Product Watch: Trinity GM-VIS Cells**  
Packin' more punch • by John Howell
- 80 Homebuilt: Two-Wheel Terror**  
A Royal Yamaha fresh from the graveyard • by Dave Ditner
- 92 4th Annual Motor Man Challenge**  
200 Off-road racers do battle in Sacramento • by Dan Haas
- 96 IFMAR On-Road World Championship Warm-Up Race**  
Prelude to the big show • by Dan Haas
- 104 2nd Look: Associated RC10GT**  
by Brian Leslie
- 148 How to: Install Radio Gear**  
The do's and don'ts of hooking up your electronics  
by Stan VanDuff
- 165 How to: Prep & Seal Graphite Parts**  
A simple technique to avoid splinters and splits  
by Doug Mertes
- 178 Track Directory**



pg. 96



pg. 186



pg. 48

## EDITORIAL

**T**ouring cars have enjoyed a steady gain in popularity, especially during the past year. If you own one, this is probably no surprise to you; if you don't, you're probably wondering what all the hype is about.

One possible reason why so many find touring cars irresistible is that of all the available types of R/C car, touring cars most closely resemble their full-scale counterparts. Most R/C cars are designed first and foremost to perform, and if they can also be made to resemble a real car, that's icing on the cake. Most touring cars, however, are nearly perfect scale replicas of the full-size racecars or street cars after which they're patterned.

## On the subject of touring cars...

This of course means that the model's chassis must also be scaled down appropriately. As a result, the touring-car's chassis is significantly narrower than that of a conventional,  $\frac{1}{10}$ -scale on-road car (which, by the way, if scaled "up" to full-size, would be over 9 feet wide!). Obviously, a wider chassis handles better, but fun-loving touring-car buffs don't seem to mind this deficiency.

In fact, with touring cars, fun is the name of the game. Most are beginner friendly and have simple

4WD layouts for easy building and sure-footed performance that can compensate for a novice's driving skills. Because they're simple, narrow and less tunable than purpose-built racing machines, you might think that experienced hobbyists would shy away from touring cars; in fact, many find them a less stressful way to enjoy the hobby or to let off steam between "serious" racing events. I know that whenever we editors get together to race touring cars, the action always deviates from serious competition to all-out hack-fest!

As the popularity of touring cars grows, so does the number of models and types available. Among them is a new breed of more race-oriented chassis designs. Although these chassis still fit the "narrow" category, they are more tunable than standard touring cars, and they're made of more exotic construction materials, e.g., carbon fiber and alloys.

The demand for such racing machinery is so great that Tamiya—arguably the *creator* of the narrow touring car—has introduced its own pro-level machine, the TA03. This new design, which features a radical, front-motor, belt-drive 4WD layout, is reviewed in this issue. The TA03 is Tamiya's first attempt to create a world-class racing touring car; don't miss this one.

Part of the touring car's success must be credited to the many racing programs created especially for these small sedans. Tamiya runs an excellent series in which the winners of regional events are invited to participate at a national level and have the chance to win an expenses-paid trip to the world champion-



BY MIKE OGLE

ships in Japan. Hobby Shack's California-based parking-lot series is also popular among touring-car racers; weekly events often draw 100 or more participants. Touring-car racing has become so *internationally* popular, in fact, that the International Federation of Model Auto Racing (IFMAR) is considering the addition of a touring-car class to the On-Road World Championships (see the coverage of the Worlds Warm-Up race by Dan Haas in this issue).

Before signing off, I'll welcome aboard Dave Ditner—our newest contributing author. Dave is an avid hobbyist (he claims to have more than 60 R/C cars in his collection!) with a flair for the...shall we say...bizarre? You'll see what I mean when you check out his home-built "Two-Wheel Terror" in this issue (this is our Halloween issue, remember). Expect to see a lot more from Dave.

And that's just a sample of what's in store for you this month. There are, of course, sizzling "Thrash Tests" and informative how-to's, helpful columns and the usual assortment of goofy stuff (mostly from Chianelli!). Enjoy!

Frank Masi, Executive Editor  
frankm@airage.com

## Radio Control CAR ACTION

### EDITORIAL

Group Editor-in-Chief TOM ATWOOD  
Executive Editor FRANK MASI  
Senior Editor CHRIS CHIANELLI  
Editor JOHN HOWELL  
Associate Editor GEORGE M. GONZALEZ  
Assistant Editor STACEY GRANELLI

### COPY

Copy Director LYNNE SEWELL  
Senior Copyeditor KATHERINE TOLLIVER  
Copyeditor JULIE GORDON  
Assistant Copyeditor JUDY L. SCHWEITZER

### ART/DESIGN

Managing Art Director ALAN J. PALERMO  
Art Director BETTY K. NERO  
Assistant Art Directors  
MICHAEL BOUSE  
ANGELA A. CARPENTER  
MATTHEW A. CHIAVELLI  
LESLIE COSTA  
Staff Photographer WALTER SIDAS  
Image Technician CHRISTOPHER HOFFMASTER

### SYSTEMS

Systems Manager GORDON OPPENHEIMER

### MARKETING

Director of Marketing GARY DOLZALL  
Marketing Manager DANIELLE RUGGIERO

### CIRCULATION

Circulation Manager ARLENE A. DELGIUDICE  
Single-Copy Coordinator JENNIFER KELSEY

### PRODUCTION

Production Assistant ARLENE MELKO

### ADVERTISING

Director of Advertising SHARON WARNER  
Assistant Manager JILL ELLEN MOLINARO  
Advertising Account Executive TOSHA CRAWFORD  
Advertising Traffic Administrator ELISE SILKOWSKI  
Advertising Coordinator ANN T. WIEBER

### PUBLISHING

Group Publisher LOUIS V. DeFRANCESCO JR.  
Publisher YVONNE M. DeFRANCESCO  
Associate Publishers  
GARY DOLZALL  
SHARON WARNER

### CORPORATE

Chairman DR. LOUIS V. DeFRANCESCO  
President and CEO MICHAEL F. DOYLE  
Vice President G.E. DeFRANCESCO  
Secretary L.V. DeFRANCESCO  
Treasurer YVONNE M. DeFRANCESCO

**RADIO CONTROL CAR ACTION** (ISSN 0886-1609, USPS 001-087) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897-3035, USA. Copyright 1996, all rights reserved. The contents of this publication may not be reproduced in whole or part without the consent of the copyright owner. Periodical postage permit paid at Wilton, CT, and additional mailing offices.

**SUBSCRIPTION PRICES:** U.S.: 1 year, \$34.95; 2 years, \$59.95. Canada: 1 year, \$51.31; 2 years, \$91.97 (Canadian prices include G.S.T.). Elsewhere: 1 year, \$47.95; 2 years, \$85.95. Canadian G.S.T. registration no. 13075 4872 RT.

**EDITORIAL:** Send correspondence to Editorial Department, *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035. We welcome all editorial submissions, but assume no responsibility for the loss or damage of unsolicited material. To authors, photographers and people featured in this magazine, all materials published in *Radio Control Car Action* become the exclusive property of Air Age, Inc., unless prior arrangement is made in writing with the Publisher.

**ADVERTISING:** Send advertising materials to Advertising Department, *Radio Control Car Action*, Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897-3035. Phone (203) 834-2900; fax (203) 762-9803.

**CHANGE OF ADDRESS:** To make sure you don't miss any issues, send your new address to *Radio Control Car Action*, P.O. Box 427, Mount Morris, IL 61054-9853, six weeks before you move. Please include the address label from a recent issue, or print the information exactly as shown on the label. The Post Office will not forward copies unless you provide extra postage.

**POSTMASTER:** Please send Form 3579 to *Radio Control Car Action*, P.O. Box 427, Mount Morris, IL 61054-9853.

**AirAge**  
PUBLISHING

**A**  
Member Audit Bureau  
of Circulations

## More Turn-Marshall Techniques

I read Derek Buono's article, "Turn Marshalling Techniques" (August '96), with particular interest because my husband is one of those with a "physical disadvantage" (a bad knee that two surgeries have not been able to fix), and



I have substitute marshaled for him for a number of years. I also do a lot of volunteer marshalling, both during races and practice. It gives me something to do and provides some real exercise, and I've made a lot of friends this way. Believe me, everybody loves a volunteer marshal, especially during practice!

While club races usually allow anyone to be a substitute marshal, many major events specify that only other drivers can fill in. So I became a driver and a ROAR member. At the West Coast Gas Off-Road Championship in Hemet last January, I finished 19th overall in 1/8 gas truck! I'd like to reinforce a couple of Derek's remarks and add a couple of my own that I feel very

strongly about:

- Get off the throttle when you're being marshalled! If you can't hang upside-down for 2 seconds without flaming out, then you need to work on your tuning. When faced with a car that's being constantly gunned, I've gone as far as to stand back, put both hands up in the air and stare up at the drivers' stand until the crashee lets off the gas. It's a very effective technique.
- Never, ever cross oncoming traffic until it's safe to do so for both you and the other cars on the track. Some drivers whine about how the marshal

for Winners



should have been there sooner; if you don't like the marshalling, don't crash in the first place! (I think a really interesting race would be one in which the drivers have to run down off the stand and marshall their own cars!)

• A cheap pair of gardening gloves (around \$3 at your local supermarket) can really save your hands. Gas engines and exhaust pipes get hot enough to sizzle flesh in a fraction of a second, and burned, painful fingers can impair your driving in the next heat. Sharp edges on Lexan bodies

can slice you without your even knowing what happened until you see the blood dripping.

- Thongs and sandals are not appropriate footwear for turn marshals! Think about it: R/C car barreling along at 70mph vs. exposed feet; guess which wins (duh!). Steel-toed Redwings are not overkill.

**SANDRA FENTON**  
*sfenton@netvoyage.net*

impressed with the unique design. How does this new car compare with other touring-sedan cars in handling and acceleration? I realize there may be little information available now, but I thought I'd ask just in case. Do you have any references I could turn to for more information on the car's specifications?

**CHRIS McGINN**  
*via the Internet*

## One Happy Camper

I have been very happy with my Traxxas Sledgehammer and have had a only few problems with it; I caused most of them by trying to fix things myself. On a few occasions, I gave up and sent the truck to the folks at Traxxas, who fixed it for free and returned it to me in under a week.

Because of the quality of its products and its customer service, I recommend Traxxas to everyone who wants an R/C car or truck.

**OLIVER HARRISON**  
*Harrold, TX*

Oliver, we're always glad to hear about positive experiences with R/C products. There is no doubt that Traxxas stands behind its products. I own a Traxxas SRT racing truck and a TCP racing buggy (now converted into a rally car) and have always been impressed with their quality and performance. Any time I reported a problem with finding parts and the like, Traxxas was quick to respond.

**George**

## Smokin' Yokomo

Tell me more about the new Yokomo YR-F2 front-wheel-drive car. I saw the chassis at my local hobby shop and was very

Chris, expect a full review of it in *Car Action* soon. You are correct; the YR-F2 is unique. The version you saw has a belt-driven, front-motor FWD design that is unlike anything currently available. The car also has an independent front and swing-arm rear suspension that are completely adjustable and use coil springs for damping. In the near future, Yokomo plans to release a racing version of this car with a graphite chassis, full bearings and oil-filled shocks.

As to performance, let's just say that I heard that Masami Hirosaka is unstoppable with this car and that he gets better lap times with the FWD YR-F2 than he does with his 4WD YR-4M. If that isn't a testimonial, I don't know what is. Both GHI and Horizon Hobby Distributors import the car and carry a full line of replacement and hop-up parts to support it, so parts and availability shouldn't be a problem. Call GHI at (714) 921-0322 and Horizon Hobby Distributors at (217) 352-1958. If you plan to race the car, find out if your track has a racing class for it. The last thing you want to do is buy a car and not be able to race it.

**George**

*(continued on page 10)*

**Errata:** in our last issue, we inadvertently printed an incorrect area code for TD Enterprises. Please contact them at: P.O. Box 3301, Lexington, OH 44904; (419) 884-2004.

## Need for Speed in Naples

Do you plan to review those Unlimited Speed Run cars I read about in the May '96 issue of your fine magazine? These cars are really wild-looking, and they're incredibly fast. I think many people would be interested to know how to build one and what is needed to get an R/C car to go over 70mph.

**CHARLES MARSHALL**  
*Naples, FL*

Charles, these cars are an absolute scream. I was fortunate enough to be able to build one and run it at the Velodrome in Carson, CA (the location of the NORRCA Super Oval Winterfest). I even wrote a feature on how to build one (see the February '94 issue of *R/C Car Action*). I also wrote a story for the May '94 issue about Team HPI driver Joe McGregor's Insane

Speed Run car, which set a record at the '93 Thunderdrome with a blazing 87.41mph average speed. Order back issues of *Car Action* by calling our back-issue hotline, (800) 877-5169.

Just for the record, you're not the only person who likes superfast cars. Frank, Doogie and I recently got into an argument when Frank made the bold statement that his 2-speed-equipped, nitro-powered, 4WD Kyosho SuperTen GP could blow away any car of ours. Naturally, Doogie and I aren't going to let that boast go unanswered, so we are working on cars that will make Frank eat his words! Expect to see an article on our adventures in the near future, so stay tuned.

George

## Ready for the Big Leagues

Awesome magazine, people! I have been getting more serious about off-road R/C racing, and I'm actually getting pretty good at it. I've decided that I'm ready to go strut my stuff at some of the bigger racing events, like the Cactus Classic and Winter Champs.

How do I transport my R/C equipment to these events via the "friendly skies"? The factory drivers couldn't possibly drive to all the R/C racing events. (Is there a way to drive to Japan?) Would you please give me tips on how to fly with my rides?

**CARL DENNIS**  
*Orange, CA*

Well Carl, most racers, including Associated

factory driver Mark Pavidis and Team Trinity/Team Losi factory driver Brian Kinwald, take only whatever R/C equipment they can

carry onto the plane (usually two bags). They check in their personal items. Of

course, their sponsors ship some important items ahead, but that isn't necessary for you. You could pick up a couple of Trinity Trans Bags or Associated Car Carriers; these will allow you to carry plenty of stuff.

For example, you could put a couple of cars, batteries and charging equipment in one bag and tools, extra tires, replacement parts, etc., in the other. Always call ahead to the airline to ask about chemicals; you may not be allowed to take motor sprays and traction additives. Inquire about size restrictions for carry-on luggage; airlines don't all use the same standards. And check out our January '93 issue for a feature on how to travel to a major race. Hope this information helps you.

George

# ALL TIRED OUT?

## High Tire Prices Keeping You Off The Track

If this sounds like your problem, check out the Trinity Street Spec line of foam tires for asphalt and carpet racing.

Available in two rear and three front compounds.

Super fresh high traction foam tires for all Street Spec and pan cars. Fronts, \$10.99    Rears, \$11.49

**TRINITY**



**WRITE TO US!** We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

### INTERNET ADDRESSES

**Frank Masi:** [frankm@airage.com](mailto:frankm@airage.com)

**John Howell:** [johnh@airage.com](mailto:johnh@airage.com)

**Chris Chianelli:** [chrisc@airage.com](mailto:chrisc@airage.com)

**George Gonzalez:** [georgeg@airage.com](mailto:georgeg@airage.com)

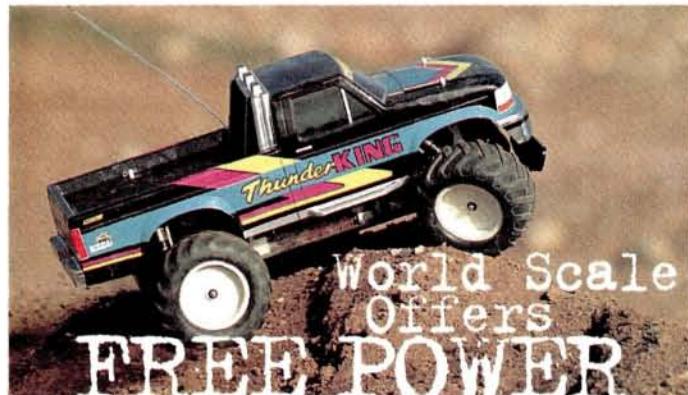
**Stacey Granelli:** [staceyg@airage.com](mailto:staceyg@airage.com)

In search of fun  
and glory, 'cause  
life's too short  
to be a sheep

• by Chris Chianelli

INSIDE

# SCOOP



## World Scale Offers TRINITY POWER

If you buy a new World Scale truck or buggy, MRC will send you a free 9.6V 2000mAh Juice Pack battery that's valued at \$99.98. Compared with a standard-size pack, the Juice Pack delivers more speed and improved run times. World Scale trucks and buggies have plenty of room to carry this gutsy speed/duration 8-cell pack. To receive your free Juice Pack, just complete the registration card that's enclosed with each World Scale kit, and return it to MRC with a shipping and handling payment of \$6. This offer ends on October 30, 1996.



## HAWG THE ROAD!



Pro-Line's new Speed Hawg III tires are serious parking-lot, low-profile racing tires whose rubber compound and tread patterns were specifically designed for neighborhood-type asphalt surfaces. Convert your on-road pan car into a mean street machine with Pro-Line's new Speed Hawg tires and wheels. Speed Hawgs fit Pro-Line 1.65x1.22-inch, medium front wheels (part no. 2601) and medium rear wheels (part no. 2602). For more information, contact Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

## The XX S-t-r-e-t-c-h

Pictured here is Losi's new Double-XT 'CR' truck before it headed off to the ROAR Stock Nationals. Its features include: a rear arm with revised shock locations; rear hub carriers with zero toe-in and adjustable dogbone sweep; rear pivot plate/pivot block with 3 degrees of toe-in; rear shock tower with optional holes for lower mounting and more suspension travel; front arms that accept an optional swaybar; and a Dodge Ram-style body.

One of the most interesting and effective new features is the Extra Long chassis. Prototypes of this new chassis were used with great success by Team Losi drivers at the '96 Florida Winter Champs. In fact, the top qualifier and the top four finishers drove trucks with what I like to call the "stretch" chassis. This new chassis

stretches the wheelbase to the maximum legal length for racing. The extra length increases high-speed stability while improving handling on rough sections of the track. The chassis is made of Team Losi's exclusive Stiffzel material and is also available in graphite.

All the above-mentioned parts, including the Extra Long chassis, can be bolted on to any existing Double-XT truck. Team Losi will also offer a 'CR' suspension kit for current Double-XT owners who want to upgrade. For more information, contact Team Losi Inc., 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.

## Indy Star Chooses Trinity Power



I'm sure Trinity is very proud of its association with Tony Stewart—a very bright, rising star in full-scale auto racing. The 24-year-old Rushville, IN, native started this year's Indy 500 at the pole position and had been leading for more than 50 laps when his Menard V6-powered Lola had mechanical problems. Tony's credits include setting records in U.S.A.C. open-wheel competition by becoming the first person in history to win the National Midget, National Sprint and Silver Crown titles in the same season. He has also teamed with the legendary Harry Ranier to run 18 to 20 races in this year's NASCAR Busch Grand National Series. The team has its eye on the '97 Winston Cup. When he isn't rocketing around the track at 200mph, Tony likes to relax with his other love—R/C racing. He loves all types of R/C racing, be it off-road, paved-oval, carpet-oval or dirt-oval. There is, however, one constant: Trinity motors and batteries are the power source.

Next time you're at the R/C track, be sure to look and see whether Tony Stewart is there. If he is, you can rest assured that so is Trinity.



# INSIDE scoop

## Soften Up for the Hard-Packed



**T**eam Kinwald Buggy Grip 2 is Trinity's new and improved traction formula. According to Trinity, this faster-acting blend of solvents promotes quicker softening on Team Losi and Pro-Line tires, and it increases traction. A combination of long-lasting agents helps to make both new and old tires more supple. This new formula proved to be an advantage on the super-hard-packed surface at the '96 Winter Champs in Tampa, FL, where Brian Kinwald and Greg Hodapp swept the Modified Mains. Buggy Grip 2 comes in a convenient spray bottle; just spray it on, and let it dry. Contact Trinity Products Inc., 1901 E. Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



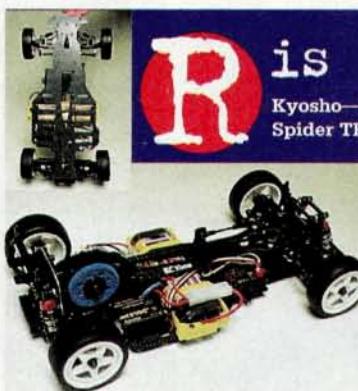
A Lincoln Mk VIII NASCAR?

Leave it to Bolink to be there first. The full-scale

Lincoln was tested at Lockheed in Marietta, GA, during the first week of May; it was tested in Charlotte, NC, the second week in May; and Bolink unveiled its 1/10-scale version on May 24. How's that for a quick response? The car has already turned in some exciting lap times, and it's a Lincoln stock car!

Narrow version—part no. BL-2269; Pro-Lite version—part no. BL-2269-L. Contact Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0252; fax (770) 963-7334.

## Classcar



## R is for Racing

Kyosho—the company that never sleeps. The hot 4WD Spider TF-2 is barely a year old, and Kyosho has introduced a new, no-holds-barred racing version called the Spider TF-2 Type R. Check out some of the high-performance features on the new Type R: a carbon chassis and upper plate, a one-way diff in front with a ball diff in the rear, universal swingshafts front and rear, Teflon™ touring shocks, 2mm shock towers and a 22-piece, full bearing set. As soon as we can get a test sample, we'll get it into CAR ACTION for you.

# M.troniks™



**APC-400 DELTA PEAK CHARGER  
\$110.00**

*M.troniks is imported into the USA by Trinity Products Inc. And Available At Your Local R/C Hobby Shop!*

**APC-400 DC PEAK CHARGER**  
Delta Peak Cut-off  
Super Small Size, Fits Easily In Pit Box  
Linear Charging, From .5 To 5 Amps  
Switch Mode Circuitry Means Cool Operation  
One Button Start, Completely Fool Proof

**ST-500 TURBO SPEED CONTROL WITH REVERSE  
\$119.00**  
High Grade TurboFET™ Mosfets  
Fully Proportional Forward And Reverse  
Protected 1.5 Amp BEC  
Set-up LED  
Linear Over Temperature Shutdown, No Sudden  
Stops, 16 Turn Motor Limit  
12 Awg Leads, Small Case Size

**ST-500 TURBO SPEED CONTROL WITH REVERSE  
\$119.00**



**TRINITY**

## Cut Pit Time

RPM's new color-coded Hex Handles will speed up repairs in the pits and make general assembly and modifications easier. Just grab the right color, and continue to work! The specially treated, precision, tool-steel tips are very durable, and the handles come in six colors: red—2.5mm ball-driver end (use with motors screws, for example); blue—0.093-inch ball-driver end (for 4-40 screws); orange—2mm (0.078 inch); yellow—0.062 inch (for 4-40 flatheads); green—1.5mm; and purple—0.050 inch (for pinion setscrews). For more information, contact RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.



## Euro-American Sedan News

Parma International has always been a leader when it comes to reproducing 1/10-scale racing sedan bodies, no matter which side of the "big pond" their full-scale counterpart was from. The Dodge Stratus is sure to be a major contender in the new North American Touring Car Championships Series. The Dodge was designed specifically for the Kyosho Spider and Tamiya and Yokomo 4WD chassis, and with its wing and slippery body lines, it should generate significant down-force for great high-speed handling.



**T**eam Losi has just added a new front tire—the Diamond Pattern—to its race-proven line. The Diamond Pattern is ideal for "blue-groove" conditions. This term refers to the most commonly used line on the track that forms a groove as it becomes embedded with tire rubber. This new tire also works well on asphalt, carpet, artificial turf and concrete surfaces. A series of diagonal cutouts across the carcass form a diamond-shape tread design. Available in Losi's exclusive Gold and Silver compounds, the Diamond Pattern comes with foam inner liners, and it fits all popular 2WD, 2.2-inch wheels. Contact Team Losi, Inc., 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.

## Diamond In The Rough



If you have a buggy chassis collecting dust in the closet and want to use it to join the recent rally-car fever, Parma's new 1/10-scale Peugeot 306 is made for you. It was specifically designed to fit off-road buggy chassis. Contact Parma Intl. Inc., 13927

Progress Pky., North Royalton, OH 44133; (216) 237-8650; fax (216) 237-6333.



# TRU-LATHE



**Cut Your Stock Motor's Commutator Without Removing The Armature.**

**TRINITY**

1901 E. Linden Ave #8, Linden, NJ 07036  
Ph: 908-862-1705, Fx: 908-862-6875

**RC4107**  
**\$249.99**

Carbide tool bit supplied.  
Motors optional.

ROAR/NORRCA  
LEGAL

**READERS'**

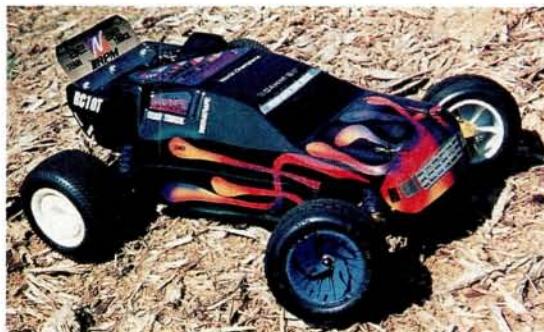
# Rides

SPONSORED BY

**NOVAK**  
ELECTRONICS, INC. RACING TEAM

## RAGIN' RACIN' RC10T

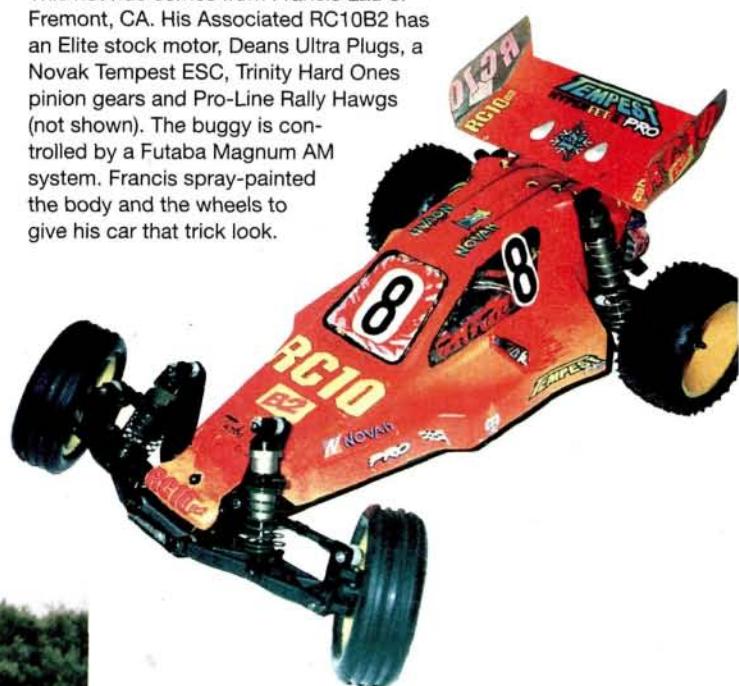
This hot ride comes from Chris Norick of Oakland City, IN. He claims that his RC10T has the baddest Dahm's body around—the Slammer—and a soul to match. The truck has been modified with RPM ball bearings, ball ends, Delrin shock pivots, body posts and a gear cover, MIP CVDs and Zero Maintenance ball-bearing steering, Pro-Line Fuzzie Ts and titanium tie rods and hinge pins. Whether he uses his Pointblank stock motor or his Trinity/Team Kinwald 15-turn triple Dirtinator, Chris says his truck can really dish it out.



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897-3035. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1996. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

## ONE NICE RIDE

This hot ride comes from Francis Lau of Fremont, CA. His Associated RC10B2 has an Elite stock motor, Deans Ultra Plugs, a Novak Tempest ESC, Trinity Hard Ones pinion gears and Pro-Line Rally Hawgs (not shown). The buggy is controlled by a Futaba Magnum AM system. Francis spray-painted the body and the wheels to give his car that trick look.



## TRYIN' A BUGGY

Until he tried this Traxxas TCP, Thorsten Gora of Stockstadt, Germany, had raced only trucks and F1s; now he's hooked on buggies, too. He runs the TCP mostly stock, but he did add a Trinity Kinwald EX-Tech motor and a Team Losi Hydra Drive with a homemade gear cover. For outdoor, off-road racing, he chooses Team Losi Gold/Silver tires and Pro-Line XTR/M2s, and for indoor carpet racing, he switches to Schumacher micro-pin blues. He likes to paint extraordinary bodies using Pactra paint, a Paasche airbrush and Autographics decals, and as you can see, his work really pays off.

## COOL-LOOKIN' CRUSHER

Crushing everything in its path is Mike McFarlin's Bigfoot XI. Mike's Bigfoot is based on an ESP Clodzilla chassis and is equipped with Futaba radio gear, Trinity matched modified motors, a Tekin 420 G2 and a 1700 SCR pack. The truck has been topped off with a Parma Desert Storm pickup body painted by Sam Yousif of Riders Hobby Shop. Mike also thanks Jay Tocco for helping provide the killer shot of his 'foot.'





## IT'S NOT EASY BEIN' GREEN

Kris Jokelainen of Thunder Bay, Ontario, Canada, sent us this photo of his RC10—the Green Cat. This buggy features a graphite chassis, Pro-Line and Team Losi tires and a personalized Viper body. Futaba radio gear

sends the signal to a Novak speed control, which delivers power to a Revolution modified motor. Kris is proud to say that he painted the body himself. Interesting choice, Kris.



## OUTRAGEOUS OFNA

Kevin Yacklin of Holland, OH, sent us this shot of his OFNA Ultra GT. It's controlled by Futaba Magnum Junior radio gear, and it's powered by an O.S. .21RZ-B engine. Kevin tells us that his Ultra—complete with custom-airbrush paint job—can go from zero to "dirty" in less than a second.



## BAD BOWTIES

These sweet-looking Chevys come from David Armstead of Zanesville, OH. David's Kyosho USA-1 (below) is equipped with a slightly stretched aluminum chassis with four-link suspension, DuraTrax Gold shocks, full ball bearings, Novak radio gear, Trinity motors and a Pro-Line body. The Blazer and pickup are Tamiya rides (the Blazer started its life as a Celica GT-4, and the pickup—above—started out as a Manta Ray). The Blazer is equipped with ball bearings, HPI wheels and tires, a Trinity Onyx motor, a Novak Rooster and a Parma body. The pickup has ball bearings, DuraTrax Gold shocks, a Novak Rooster, a Trinity Topaz motor, HPI rims shod with Pro-Line Speed Hawgs and is topped off with a Pro-Line body.



## INCANTATION FOR SPEED

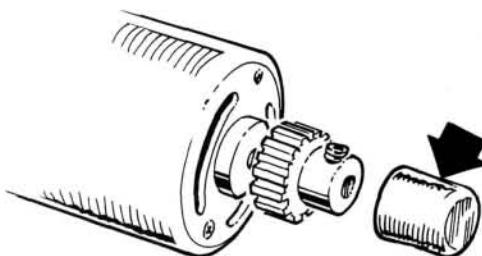
According to Simon Coulombe of Des Coteaux, Quebec, Canada, this Double-XT is a force to be reckoned with. It has been modified with titanium turnbuckles, MIP CVDs and Pro-Line Road Hawgs. Powered by a Trinity Diamond 12-turn double and controlled by a Novak Hammer Pro, the Double-XT leaves the other racers in a cloud of blue smoke. Simon warns his competition: "Don't mess with the Sorceress!"

**NOVAK**  
ELECTRONICS, INC. *RACING TEAM*



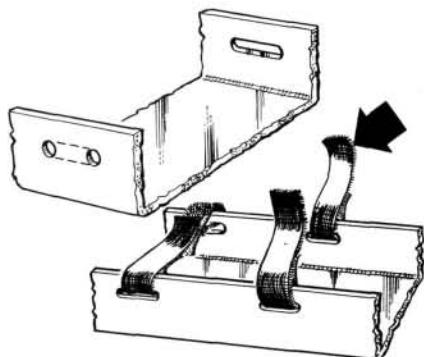
## PIT TIPS

by Jim Newman



### Cap It

To prevent the setscrew from backing out, squeeze a small, tightly fitting rubber cap over the pinion's boss.  
**BOBBY CANNON, Redlands, CA**



### LX-T Kwik Battery Holder

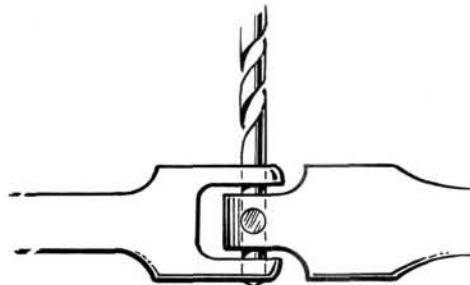
Drill, then slot the sides of the chassis tub to accept Velcro™-brand fastening straps.  
**MATT BATH, Patahala, OH**



### Cool, Dark Windows

For a great look, apply window tinting from your auto-parts store to the windows of your R/C vehicle. Follow the application instructions, and use a soft, rubber squeegee. The film can be applied to either the inside or the outside of the windows.

**BRYAN MORAST, Susanville, CA**

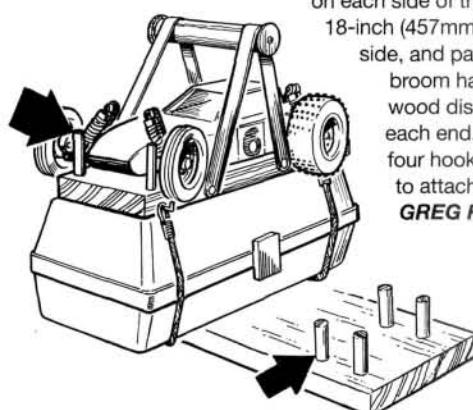


### High-Speed Steel Pin

Replace a lost universal drive pin with the shank of a snugly fitting drill bit. To keep the pin captive, use a Dremel grinder to cut and de-burr the bit, then slip a sleeve of firmly fitting rubber fuel line over the joint.  
**JOHN JACOB, St. Clair Shores, MI**

### Car Carry-All

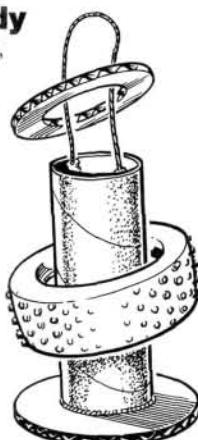
To make this car tote, cut a piece of board to fit, and glue four short dowels into holes in the front and rear on each side of the A-arms. Nail an 18-inch (457mm) strap onto each side, and pass it over a piece of broom handle with a plywood disk screwed onto each end. You can also add four hooks and bungee loops to attach your toolbox.  
**GREG FEE, Darby, MT**



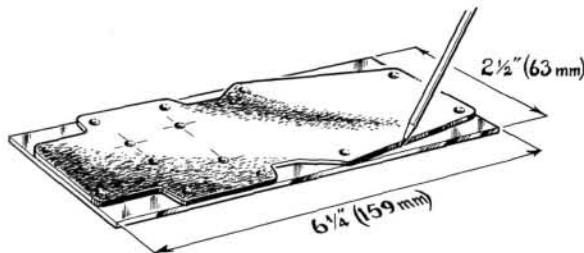
### Tall Tire Caddy

To make this tire caddy, hot-glue a cardboard tube to a circular corrugated-cardboard base. Slip a circle over the tube to hold the tires in place when you travel. For a convenient handle, hot-glue a length of string or wire to the tube's top.

**JESSE HAND, Wallkill, NY**



*Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897-3035. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.*

**Tamiya Hi-Lux Conversion**

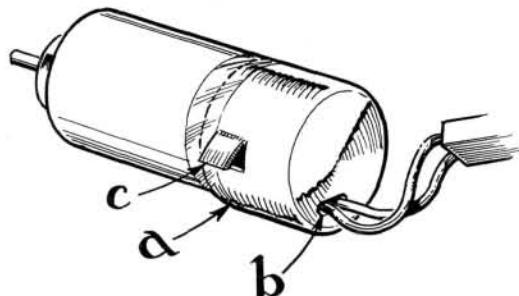
Trace around the fiberglass sub-chassis on  $1/16$ -inch-thick (1.5mm) aluminum, then use a Team Associated drill jig and an old chassis to position the new, counter-sunk holes. The Stealth transmission allows a wider choice of pinion and spur gears. You must use Associated dogbones with this setup.

**JAMES WARD, Merced, CA**

**Decorator Dirt Excluder**

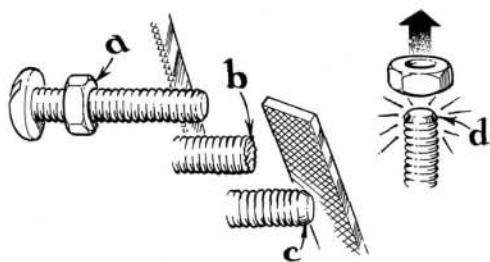
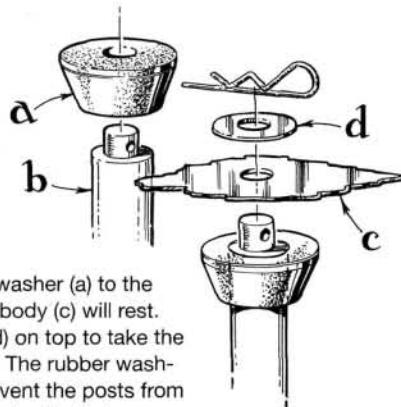
After cutting an exit hole (b) for the wires and vent louvers (c) for cooling, tape the colored plastic cap of a spray can (a) to the end of the motor.

**STEVEN ALLEN, Birmingham, England**

**Punch-Resistant Posts**

Glue a rubber faucet washer (a) to the post (b) on which the body (c) will rest. Place a thin washer (d) on top to take the wear of the body clip. The rubber washer's large area will prevent the posts from punching through the plastic body.

**JOEL GAMEZ, San Dimas, CA**

**Quick Wing Adjustment**

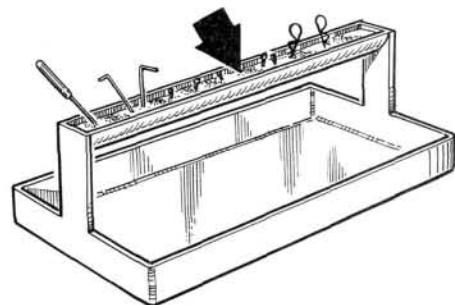
By using wing screws with the head uppermost and curved mounting wires, without picking up the car, Paul can speedily change the position and setting of the wing and be off on another run.

**PAUL KOSTURA, Fountain Hills, AZ**

**Clean, Shorter Screws**

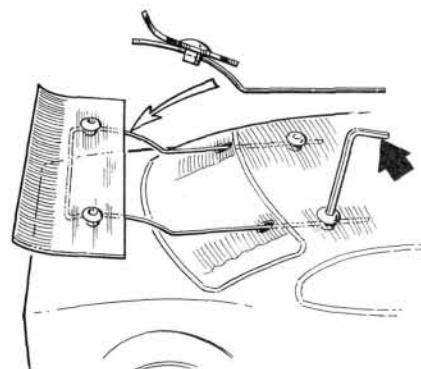
Thread a nut (a) onto a screw, and saw the screw to the desired length; this will leave a ragged end (b). Use a fine file to smooth the screw's end and to put a short taper—or lead (c)—on it; remove the nut to do a final cleanup of the screw thread at (d).

**WAYNE TARR, Hamilton, New Zealand**

**Not-So-Silly Putty**

For easy access to useful items such as Allen keys, screws and clips, fill the hollow handle of your plastic tool caddy with Silly Putty, then stick the small things into it.

**TOM MAYOSKY, Clifton, NJ**





## TROUBLE SHOOTING

by George M. Gonzalez

### Pushy F1 Car

Believe it or not, I'm a 45-year-old male who just got into R/C racing. I have two Tamiya F1 cars—an F102 and an F103 RS chassis. I'm having a problem with pushing in the corners. I read your article on setting ride height, but neither one of my cars has a ride-height adjustment. The only way to adjust ride height is by truing down the tire's diameter. I'm currently using TRC racing tires. They're the only tires my local hobby shop carries that come in different compounds. When I mount my front and rear tires, should the diameters be the same, or should the front tires have a smaller diameter?

I've been running the same compound tire on the front and rear of the car, but have run softer compounds up front. Could this also be part of my problem? I've also been using stiffer springs up front to resolve the pushing problem, but after reading some of your articles, I think I will go to softer springs.

Any suggestions on shock setup? I've replaced the mono shock on both

my cars with Tamiya's hop-up aluminum shocks, but the instructions recommend using 300-grade oil for the F103 chassis, and I only have Associated 15, 20 and 30W shock fluid. Please help.

*PerryRubay@aol.com*

Perry, there are a few things you could do to remedy your pushing problem. Tire diameter has little or nothing to do with why your car is pushing. As a rule, it's good to have your car as low to the ground as possible as long as the chassis doesn't scrape the track's surface. And you're right; there are no provisions for front-end ride-height adjustment on the Tamiya F1s, so varying the tire diameter is the only way to make subtle adjustments in ride height.

Running a smaller-diameter tire up front will give your car the wedge effect (higher in the back than in the front) and increase front traction, so if your car is pushing, this is a worthwhile setup. Also, try this: set up the car with equal

front and rear ride height, then use the same tire compound all the way around. Next, tighten the two T-plate tweak screws about a quarter turn each (assuming you have set up your car according to the manufacturer's suggestions), but make sure the screws don't bind up the rubber O-rings. If the car still pushes, use a set of softer springs up front.

Trinity, Paragon and Racer's Choice all make traction additives. These products really work, but use them only as needed because these additives speed up tire wear. If your car continues to push, add a little traction additive to the front tires. If all else fails, switch to a softer front tire. Many racers actually use a

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at **Radio Control Car Action**, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, **Radio Control Car Action**, 251 Danbury Road, Wilton CT 06897-3035. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

harder front-tire compound on their Tamiya F1 cars because the tires last longer.

The center shock does have an effect on rear traction, but it isn't that noticeable. Because a shock is used mainly for damping, it shouldn't be used to balance front and rear traction. Tamiya 300-grade oil is comparable to Associated 25W oil, so the Associated oil should be just fine for most tracks. Good luck.



### Choked-Up Yoke

I own an older Yokomo YR-4 that I feel is still one of the best touring-car chassis. I was running it at a mall parking lot the other day when the car just stopped. I mean it came to

a screeching halt! I had heard that sometimes small rocks can get trapped inside the diff housings and lock up the drive train, but this has never happened to me before. I guess I wasn't so lucky this time. After I took the rear diff apart, a small piece of glass fell out of the housing, and I noticed that the diff gear was damaged. I've ordered a new diff gear, but I wonder if there's anything I could do to fix the gear in the meantime

and if there's anything I could do to prevent this from happening again?

**LUIS GIORDANI**  
Highland Park, CA

Luis, here's how to prevent this from happening again: grind a small opening in the back of the rear bulkhead where the bulkhead sits on the flat chassis plate. A  $1\frac{1}{4} \times 1\frac{1}{2}$ -inch opening should suffice. Now any small rocks (or small pieces of glass) that find

their way into the rear bulkhead should find a way out before any damage is done to the diff gear.

As for salvaging the diff gear, use a sharp hobby knife to open the gap between the damaged teeth, and remove all burrs in the process. You'll probably be able to use the gear again, but it will sound a little gritty. At least, you'll be able to run your car while you wait for the replacement gear.



## Battery Blues

I have a quick question about battery charging. I have an assortment of 1400 SCR, 1700 SCRC and 1800 SCRZ 6-cell battery packs. I just picked up a good charger—finally; it's a Tekin BC 67 AC/DC peak charger that has three charging modes and a current-adjust knob. My question is: what charging mode should I use, and where should I set the current (amps) for each of the above-mentioned batteries?

**DAN WIGGINS**  
Bridgeport, CT

Dan, the Tekin BC 67's charging modes are as follows: the "P" mode, or regular peak charge, should be used when a little power is still left in the pack (not completely dumped). The P2 mode, or re-peak, is used to top off your pack before a race (not intended to completely charge a battery pack). CS mode, or cold start, is only used when you know for a fact that your pack is completely dumped (for

instance, you hooked up the pack to a light bar and dumped it completely). I almost always use the CS mode because it's less sensitive and never false peaks. Besides, I always dump my cells and cool them off before charging.

The 1400 SCR batteries could be charged from 4.5 to 6 amps; 1700 SCRC battery packs from 4 to 5 amps; and 1800 SCRZ battery packs from 3 to 3.8 amps. If you have

matched packs, charge them at the charge rate that's printed on the label. Keep in mind that the higher the charge rate, the higher the voltage, and the lower the charge rate, the higher the capacity. Good luck!



## Thunder Without Lightning

I own an MRC Thunder King, and I like the truck very much, except for one thing: it's not fast enough for me. I tried everything from higher torque motors to better battery packs. None of these things has worked, and the truck is still too slow. I've spent a lot of money hopping-up the truck with all the A&L aftermarket parts, and I'd like my truck to scream. Do I need an Aveox brushless motor like the one you used on your MRC Baja King to make the thing fly? Any suggestions you could give would be appreciated.

**KEVIN DEBELAK**  
KevinDebelak@prodigy.com

Kevin, you didn't tell me what kind of motors or batteries you're using, which is important information. You did say that you use high-torque motors, but for all I know, they could be competition stock motors. You also mentioned that you tried better battery packs, but what is your definition of a better battery pack? Keep in mind that you will need at least 7 cells

and a pair of modified motors to motivate this 8-pound monster with any authority, but I strongly recommend that you use 8 or 9 cells. If you bolt on a couple of modified motors and install one of MRC's 8-cell, 2000mAh battery packs, I think you'll be very impressed with the truck's performance.

If you run modified motors and a 7- or 8-cell pack and your truck is still slow, then there is definitely something wrong with your truck's driveline.

First, clean all the bushings with motor spray, and apply a liberal amount of grease to them. If you notice any play in the bushings, consider replacing them with new bushings, or even better, upgrade them with bearings. The Thunder King comes with plastic bushings, which should be replaced from time to time. MRC sells an eight-piece, 1260-size bushing kit for the wheels (part no. 9632007), but if you have a new Thunder King with larger-diameter rear

bushings, you'll also need the four-piece, 1370-size bushing kit (part no. 9632010).

Next, check the truck's slipper clutch and diff to make sure they aren't slipping. Check the diff by tightening the slipper-clutch adjustment nut until the tension spring is completely compressed. With one hand, hold the truck's right tire and spur gear firmly, and try to rotate the opposite wheel with your other hand. It should be extremely hard, if not impossible, to turn the wheel. If the wheel turns without any effort, the diff is not properly set.

The diff-adjustment nut is behind the left out-drive (on the opposite side of the spur gear). Tighten the 3mm diff-adjustment nut a quarter turn at a time with a 1.5mm Allen wrench; then check the diff. Keep tightening the nut a quarter turn at a time until the diff is tight.

Setting the slipper clutch is much easier than adjusting the diff. All you have to do is perform a few full-speed takeoffs. A properly set slipper clutch will slip for approximately 3 to 4 feet before it fully engages the transmission. Just tighten or loosen the slipper-adjustment nut until the clutch slips for about 3 or 4 feet. I hope this information gets you up to speed. ■



by Brian Leslie

# Using Ni-Cds for Transmitter and Receiver Power

MOST PEOPLE are familiar with the use of Ni-Cd (nickel-cadmium) batteries to power off-road and on-road cars and trucks. But Ni-Cds can also be used to power your radio transmitter, receiver and servos. This month, I cover the differences between Ni-Cd and alkaline batteries, how to get as much power from Ni-Cd batteries as you do from alkalines, how to power your transmitter

with Ni-Cds and how to charge and discharge AA Ni-Cd packs.

## NI-CDS AND ALKALINES

Most pistol-grip transmitters, such as Airtronics' RSV2P and Futaba's Magnum Sport, require 12 volts to power them. If you use eight AA alkaline batteries, you probably know that each one produces 1.5 volts ( $8 \times 1.5 = 12$  volts). Ni-Cds produce only 1.2 volts per battery

( $8 \times 1.2 = 9.6$  volts). When you install a fully charged set of Ni-Cds for the first time, you will notice that the power indicator on your transmitter reads only about 80 percent. That is because 9.6 volts is 80 percent of 12 volts. This is not a problem. Your transmitter will run well on 80 percent power with no noticeable loss in range or performance.

When Ni-Cd batteries are connected in series

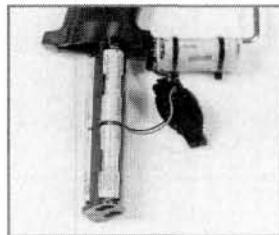
you total their voltages; the current rating, amp hour or milliamp hour, stays constant. For example, if you use a 7.2V 1200mAh battery pack to power your car or truck, you have six, 1.2V, 1200mAh cells wired together in series. You could connect 100, 1.2V 1200mAh cells together and not gain a second of run time. The number of batteries only determines the voltage, not the current capacity.

A higher voltage makes your car faster, but it will not lengthen run time. The same holds true of your radio.

## How to Get 100-Percent Power

For those of you who like to see a 100-percent reading on your radio's power indicator, this is possible with Ni-Cd batteries. You can either buy a rechargeable 12V battery pack from your transmitter's manufacturer, or you can add two cells to your existing eight Ni-Cds. Ten cells at 1.2 volts each equals 12 volts—the voltage necessary for a 100-percent power reading on your power indicator.

Take a look at your transmitter battery holder; notice that the battery cells are joined in series. In other words, the positive side of one cell joins the negative side of the next cell, and so on. You need to break into the series and add two cells. There are two ways to do this:



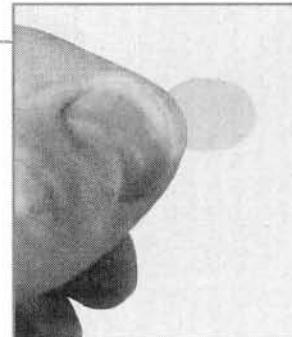
**Connect the 9V battery clip to the Radio Shack 2-cell battery holder, and mount the battery holder on the handle of your transmitter.**

**OPTION 1.** Cut the wire that goes from the positive side of one bank of batteries to the negative side of the adjacent bank. Drill a hole in the battery hatch and pass the leads from a 9V battery clip (Radio Shack part no. 270-325)

through the hole that leads into the transmitter's battery compartment. Solder the black lead to the positive end of the wire you just cut. Solder the red lead to the negative end of the wire you cut. Now connect the clip to the 2-cell battery holder (Radio

Shack no. 270-382). You now have 10 AA batteries in series.

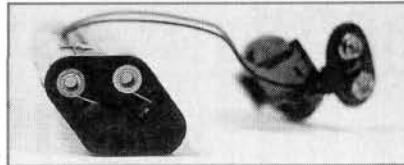
**OPTION 2.** Drill a hole in the battery hatch, and pass the leads from a 9V battery clip (Radio Shack no. 270-325) through the hole that leads into the transmitter's battery compartment. Remove two batteries from one of the holder's banks. Solder the clip's black lead to one battery's positive end, and solder the red lead to the other battery's negative end. Place the batteries back in the holder. Next, to prevent the leads from touching, place some non-conductive material (Mylar or Lexan) between the two batteries where you soldered the leads. Finally, connect the clip to the 2-cell



**To prevent the leads from touching (shorting out), cut a small piece of Lexan and install it between the two batteries you have just soldered.**

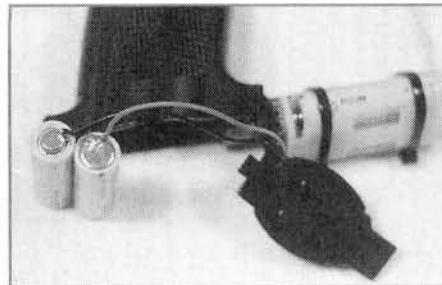
battery holder (Radio Shack no. 270-382).

To secure the 2-cell battery holder to the handle of your transmitter, use either tie-wraps or electrical tape. You can shrink-wrap the assembly for additional protection.



**Cut and splice the positive and negative leads inside the battery cradle, drill a hole in the battery hatch plate, pass the new wire leads through to attach the Radio Shack 9V battery clip, and this is what you'll end up with.**

**You can also solder the leads from the 9V battery clip directly onto the batteries instead of to the wires inside the battery cradle. Either way will work fine.**



## Charging Ni-Cd Packs

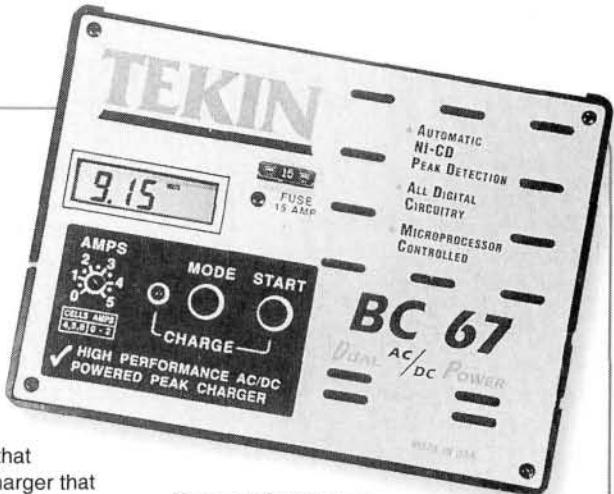
Many companies, e.g., Hobbico\*, make chargers specifically for transmitter and receiver battery packs. Some manufacturers, such as Tekin\*, Novak\* and Competition Electronics\*, offer peak-detection chargers that, in addition to your main battery pack, can be used to



PHOTOS BY BRIAN LESLIE

**Most radio manufacturers sell optional Ni-Cd trickle-chargers that can fully charge your cells overnight.**

charge your transmitter and receiver packs. If you have this type of charger, you can use it to charge your transmitter and receiver packs by adjusting the current to no more than 2 amps; the lower the setting the better. I suggest that you only use a charger that has an adjustable current setting. Avoid chargers that have a current that's preset to charge sub-C packs of 1200mAh or more. Receiver packs generally put out about 600mAh. If you try to charge them at a rate that's too high you will overcharge the cells and force the gases out of them; this will eventually destroy them.



**You can charge your receiver packs with a high-quality peak-charger, such as this Tekin BC 67. Be sure to charge these delicate cells at 2 amps or less.**

- **DISCHARGING.** To discharge your transmitter and receiver packs, simply leave your transmitter and receiver turned on overnight. This will safely discharge the packs, and the batteries will be ready for charging the next day.

## QUESTIONS & ANSWERS

**Q** What is the key to winning in off-road racing?

**A** Huge question. Many things contribute to a winning combination. How about skill, excellent equipment and practice? But one overlooked factor is patience. Do not crash. More often than not, the person who crashes least will finish toward the front. In other words, going fast often means "driving slow."

**Q** Why do gas-powered trucks have their windows and windshield cut out?

**A** Gas engines require lots of airflow through the fins on their head to keep them running cool. The biggest enemies of a gas engine are heat and dirt.

**Q** What are progressive springs? I've seen them advertised for on-road cars.

**A** Progressive springs start out soft but become progressively stiffer as they are compressed. Unlike regular springs, which have the same rating no matter how much compression is involved, progressive spring rates increase as the spring is compressed.

## Power Your Car with Ni-Cd Receiver Packs

In your electric off-road car or truck, there is no advantage to using a receiver battery pack. The power your receiver drains from your battery pack is not enough to overcome the extra weight of a receiver pack. But electric on-road cars are a different story. Because most on-road cars weigh less than the legal race limit, a small receiver pack can be used to add weight to the chassis in key locations. This is a helpful tool in suspension tuning and chassis setup. Keep in mind, however, that most on-road racers use the small, light, 5-cell, 70mAh battery packs.

Many companies make assembled receiver packs with a variety of current (mAh) ratings. The higher the rating, the longer the run time between charges, but this also means larger batteries (not always a good thing). In general, AA Ni-Cds produce about 600mAh, and four wired together in series are necessary to power a



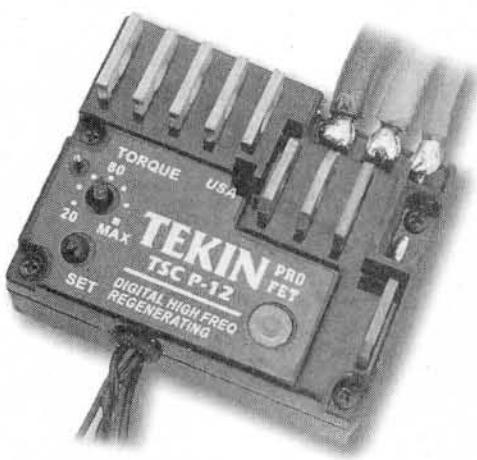
**Although receiver packs are not necessary on electric cars equipped with an electronic speed control (ESC) with battery-eliminator circuitry (BEC), receiver packs are necessary on nitro cars.**

receiver and steering servo for a full day of R/C action.

### CONCLUSION

If you do not use Ni-Cds in your transmitter, you are tossing a lot of money out the window. For a small investment, you can purchase a full set of AA Ni-Cd batteries. (Sometimes they even come with a charger). It is an investment worth looking into.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.*



## Tekin TSC P-12

LOOKING for a really mean ESC but trying to avoid a really mean price tag? Take a close look at Tekin's\* TSC P-12. It has all the features of Tekin's top-of-the-line TSC G-12 but has a slightly higher resistance—still killer low—and a lower price.

The TSC P-12 is meant for racing—forward only with brakes—and its advertised resistance is quite good, so I didn't expect any heating problems. It's microprocessor-controlled, too, and that makes possible a bevy of pro features, such as high-frequency motor control, current-limiting and Quick Tune One-Touch™ setup. User-replaceable wires make cutting the wires very short practical in every installation, and there's no fear of having future installation problems.

The standard, factory-installed, Tamiya-style battery connectors and bullet-style motor connectors typically have high resistance; they waste so much power that I've even seen them melt. The TSC P-12 doesn't have them, so it's a little tougher to install than a sport model, but the increase in performance

makes the slight inconvenience well worth it. Top racers prefer to eliminate connectors and hard-wire their battery pack and motor. I hard-wire my motor and use high-grade connectors, such as those by Deans\* (Ultra Plug) or Litespeed\*, on the battery pack.

The 20-page instruction book contains some really good pictures, and the section on transmitter adjustments is outstanding. If you follow the settings given in the chart, you'll have the best throttle response possible.

The TSC P-12's bottom is flat—perfect for mounting with double-sided tape. Inside, I found computer-grade components and workmanship: heavy etch coated with heavy solder was the norm in areas that carried the heavy current.

Three types of heat-sink tabs protrude from the top of the controller. The first group has five FETs wired in parallel for very low resistance; they handle the massive forward current. The next group contains two FETs for braking and a Schottky diode, which protects the TSC P-12 from the motor-generated noise spikes. Finally,

there's a single, massive BEC voltage regulator that's rated at 6 volts and 5 amps. I'm not sure that this regulator would be able to provide 5 amps continuously without some serious heat sinks, but it definitely should be able to provide the juice needed to power the high-speed, high-power servos preferred by top racers.

### TEST 1—RESISTANCE

With 12 amps of current flowing, I measure the voltage drop across the ESC and then calculate its "on" resistance by dividing the measured voltage drop by 12. I measure resistance twice—along the full length of the motor wires and battery wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

• **Voltage drop along the full length of the battery wires and motor wires:** 0.06 volt—a resistance of 0.005 ohm (identical to the TSC G-12's).

• **Voltage drop 2 inches along the wires:** 0.04 volt—a resistance of 0.003 ohm. This is low—only a little higher than the TSC G-12's 0.0025 ohm.

### TEST 2—OVERHEATING

I "cook" every controller I test by adjusting the resistor bank to pass 20 amps of current, jamming the throttle wide open and running the ESC for 15 minutes while it pumps a hefty 20 amps. The heat sink is usually in place, but I don't provide any

air cooling.

My aim is to see whether a controller would withstand several, back-to-back, 4-minute battery-pack dumps without overheating. I jacked the current up to 20 amps (the average current an ESC will see during a 4-minute race) and let the TSC P-12 cook for 15 minutes. After that, the heat sink was quite warm, but I could still hold it. (The TSC G-12 only got a little above room temperature.) If you use the provided heat sink and mount the ESC where it will get plenty of cooling air, it will easily handle any modified motor and most twin modified setups, too.

### TEST 3—SHORTING OUT

In this test, I check to see whether the ESC could survive the heavy current it would encounter if a gear jammed or the motor fried.

I jammed a dead short across the motor leads, and the current jumped to 40 amps (the limit of my power supply). After a

### WHAT IT HAS

- Three-wire battery/motor hookup.
- Seven FETs (5 for forward, 2 for brakes).
- Schottky diode.
- Massive BEC voltage regulator.
- High-frequency motor drive.
- Automatic thermal shut-down.
- Quick Tune One-Touch™ setup.
- Built in pulse-checking LED (monitors neutral and full speed).
- Calibrated current-limiter control knob.
- Reverse-connection battery-protection fuse.
- Monster battery and motor wires.
- Receiver plugs for all the popular brands of radio.
- Heat sinks, motor caps, servo tape, tie-wraps, decals and an instruction book.



minute, the TSC P-12 was too hot to touch comfortably (but it was well below painfully hot). No doubt, Tekin's CoolSwitch Circuit™ helped here. It works by using a very fast MOSFET rise and fall switch time to reduce FET heating, which occurs in the "linear region." The TSC P-12 can stand a lot of abuse and keep its cool.

#### HIT THE ROAD, JACK!

Before installing the TSC P-12 in my MRC MT-10S truck, I took a second look at the instruction book, which contains all the installation and

## SPECIFICATIONS

### DIMENSIONS

Height (w/heat sink) . . . . . 1.12 in.  
Width . . . . . 1.41 in.  
Length . . . . . 1.76 in.  
Weight (w/wires and heat sink) . . . . . 2.5 oz.

### TUNING

Access to controls . . . . . Excellent  
Ease of adjustment . . . . . Excellent

### LIST PRICE/WARRANTY . . . \$150/120 days

### ELECTRICAL (Mfr.'s specs.)

Max. voltage (12 cells) . . . . . 15 volts  
Min. voltage (4 cells) . . . . . 5 volts  
Max. current . . . . . Not listed  
Continuous current . . . . . 300 amps  
Resistance . . . . . 0.0025 ohm

### TEST PARAMETERS

Voltage . . . . . 6 volts  
Current . . . . . 12 amps  
Voltage drop  
—along full length of  
battery/motor wires . . . . . 0.06 volt  
—2 in. along wires . . . . . 0.04 volt  
Calculated resistance\*  
—along full length of  
battery/motor wires . . . . . 0.005 ohm  
—2 in. along wires . . . . . 0.003 ohm  
BEC voltage, 6-cell pack . . . . . 5.65 volts  
\*Resistance = Voltage drop ÷ Current

**COMMENTS:** a true racing ESC; small, yet strong; low resistance; high-frequency motor control; torque control; Quick Tune One-Touch™ setup; very little heating under heavy load.

setup information I needed. The wiring diagram is especially helpful. (A three-wire controller is a little tricky for a first time racer.) Just remember that hooking up a three-wire ESC is almost the same as installing a four-wire controller, with the difference

wiring before you connect the battery.

I now live in the country, and there's virtually no traffic on my road, so I can drive a loop that goes across my yard, down the bank to the road and back along it. With a 6-cell pack

## The TSC P-12 can stand a lot of abuse and keep its cool.

that you have to run an extra wire between the positive side of the battery and the positive motor terminal. I use Lite Speed connectors. I run a 12AWG red wire between the red half of the connector and the positive motor terminal. Where this wire passes the ESC, I strip off about  $\frac{1}{2}$  inch of insulation and then splice/solder in the red wire from the ESC. A  $\frac{3}{4}$ -inch length of shrink-tubing covers the solder joint. The trick here is to keep the red wire short. (In a three-wire setup, the red wire going to the ESC doesn't carry any motor current, so it doesn't affect performance.) Just read the instructions, and you're unlikely to have any trouble installing the TSC P-12.

Instructions read, I installed the controller in my MRC MT-10S.

It's comforting to know that the TSC P-12 will survive a reverse battery connection by blowing its reverse-voltage-fuse link. But if you swap the black battery wire and the blue motor wire, the motor will run wide open, so read the instructions and be careful. If this is your first attempt at installing an ESC that doesn't have factory-installed connectors, have a friend or hobby-shop expert check your

installed, I hit the throttle and my MRC MT-10S took off, spinning its back wheels. I quickly discovered that this hot ESC has no bad habits. Slow and moderate speeds are silky smooth, control is precise, and braking is very strong but controllable. Run times were longer than I had expected with my current gearing.

When testing an ESC, I always run the battery to a complete dump, and I found that the TSC P-12 maintains steering to the end. As the battery dumps, the TSC P-12 decreases the current going to the motor and ensures that there's enough juice going to the receiver to keep it working properly. The P-12 has a voltage booster that maintains 18 to 20 volts drive to the MOSFET gate with input voltages below 3 volts. It also has a second voltage booster that maintains 3 volts for the microprocessor with as little as 1.2 volts.

It operates with full performance below the operating point of most receivers. This controller is bound to save a race or two when, on a virtually dead pack, it makes it that last 10 feet down the straightaway without veering into the wall.

I range-checked the radio, and the truck was solid (no glitching) way past the distance required to cover any track. After

every run, the battery and motor were smoking hot, but the TSC P-12 was only a little warm. Given even modest air cooling and the Tekin heat sink, this ESC will not overheat.

Next, I tried the current limiter (torque control). To test its range to the full, I turned it down to minimum, put the truck on the ground and hit the throttle; it wouldn't do more than crawl. I jacked up the current limiter a little at a time until the truck ran at full speed but did not spin its wheels at takeoff. The TSC P-12's current limiter has such a wide range that you should be able to match it to any track conditions. For most racers, the printed numbers on its dial will be enough to set a car up for a particular track (keep records of which setting works best at which track).

### CONCLUSION

The TSC P-12 will handle multiple modified motors with ease, and its high-frequency motor drive offers many benefits: motors run cool and last longer, run times are longer, and throttle response is smooth (this is especially noticeable at slow to moderate speeds). The TSC P-12 has the kind of control that should make it a snap to motor around a tight roadcourse.

Using the current limiter, you can adjust your ESC all the way from a crawl to wheel-spinning, off-the-line speed. The TSC P-12 is a purebred; its moderate price should make it very attractive to those who want a killer racing machine but not a killer price.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176. ■

## REEDY MODIFIEDS

**"Z" Series Fire Hawk Motor**

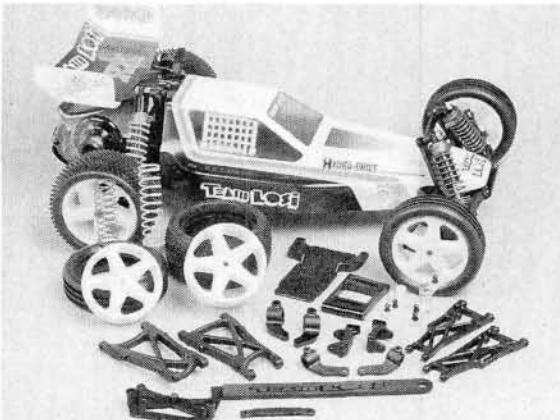
Among the features of this new 27-turn, ROAR-specification stock motor are: an endbell molded of a heat-resistant, lightweight, rigid material; a vibration-absorbing brush-damping system that decreases brush float, increases motor efficiency and comm and brush life and decreases brush bounce; a completely new can



made of thicker 1.4mm material (for a greater magnetic field) and with a vent system for additional cooling; new heat-resistant magnets; and a new armature with a dual-lamination design.

**Part nos. and prices—300 (Fire Hawk Stock), \$36; 301 (Fire Hawk Plus, dyno sheet included), \$40.**

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; fax (714) 850-1744.



## NOVAK

**Explorer™ Sport ESC**

This economical, reliable ESC is powered by MEGAFET transistors and is equipped with Solid State RVP™ and thermal-overload protection. The exclusive Polar Drive Technology™ ensures smooth running and increased radio range. Factory-installed motor plugs and battery plugs are included. Built-in brake-light circuitry allows you to power two LEDs.

**Part no.—1900; price—\$99.**

Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92715; (714) 833-8873; fax (714) 833-1631.



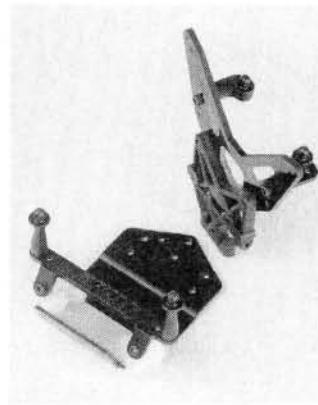
## RPM

**Adjustable-Width Truck-Body Mounts**

Made for the Associated RC10T, RC10T2 and RC10GT, this new mounting system eliminates interference between the body's contours and the body mounts. This system offers several mounting positions, including those for stock and wide setups. Molded of tough, black nylon, these posts will not strip as easily as stock posts. Each set comes with two front and rear body posts, one front chassis mount and two reversible rear-shock-tower mounts.

**Part no.—8054; price—\$6.95.**

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.



## PARMA

**Detailing Pen**

This pen features a new, improved, permanent ink and a longer-lasting, metal-encased, ultrafine point. It's sold individually and in a bag of six.

**Part no.—10396; prices—\$1.75 each; \$10.50/6.**

Parma Intl. Inc., 13927 Progress Pky., North Royalton, OH 44133; (216) 237-8650; fax (216) 237-6333.



## GREAT PLANES

**Glue-B-Gone™**

This unique pumice stone—which easily works with soap and water—provides a chemical-free way to remove CA and other adhesives from your fingers. Each long-lasting bar measures 1.5x3x0.5 inches.

**Part no.—GPMR6041; price—\$6.99.**

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



## TEAM LOSI

**Double-X 'CR'**

This new, racing 2WD buggy kit features the Hydra-Drive™ system, bearings, a sleek, low-profile body, a revised larger "V"-wing, 5-spoke rigid wheels, Silver-compound IFMAR pin tires, 25-degree spindles, front arms that accept an optional swaybar, a front-bulkhead brace, an adjustable steering bellcrank/servo-saver, new rear arms, a rear hub carrier with zero toe-in and a newly designed rear pivot-plate/pivot-block assembly with 3-degree toe-in. All these new parts can also be bolted right onto any existing Double-X buggy.

**Part no.—A-0026; price—\$349.95.**

Team Losi, 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.

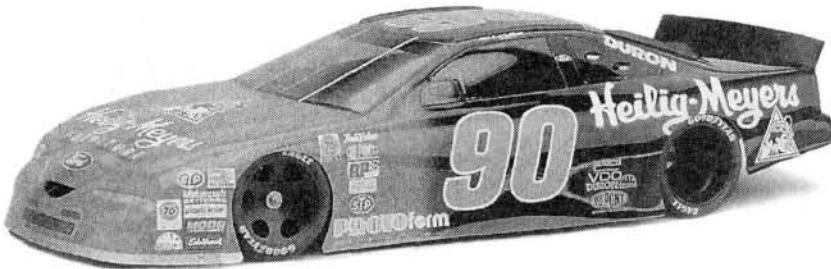
PROTOFORM

## 1996 T-Bird SS

This new  $\frac{1}{10}$ -scale body is molded of crystal-clear Lexan in both light (0.030) and regular (0.040) thicknesses. It will fit the RC10L SS, the EV10ss and most other superspeedway pan cars, and it's perfect for short to intermediate-length tracks.

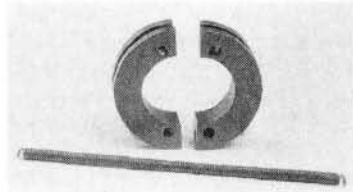
**Part nos.**—1212L (0.030), 1212R (0.040); **price**—\$19.95 each.

Protoform, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.



MIP

## 2-N-1 Clutch for the Losi GTX

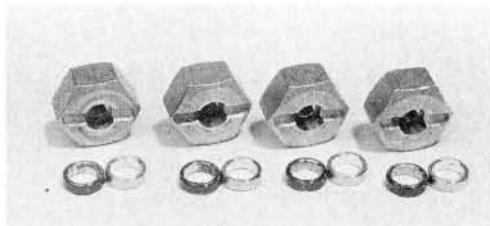


This new

clutch has a custom extension spring and includes large clutch shoes made of a high-grade composite material. The clutch shoes can be run in both trailing and leading-edge positions.

**Part no.**—3026; **price**—\$11.95.

MIP, 746 E. Edna Pl., Covina, CA 91723; (818) 339-9008; fax (818) 966-2901.



FACTORY WORKS

## Hex-Drive Wheel Adapters

These new hex-drive adapters, designed specifically for the Yokomo YR-4, allow Tamiya and HPI wheels to fit tightly on the YR-4 axles. The adapters come with a set of eight bearing spacers; these allow you to tighten the wheels without binding the bearings.

**Part no.**—6190/set of four; **price**—\$16.95.

Factory Works, 505 Smith Ave. #105, Corona, CA 91718; (909) 735-5516; fax (909) 735-5642.

JR

## 2700G Super Servo

With its hard-anodized aluminum and brass gear train and ultra-quick 0.09 second/60-degree transit time, this new servo is perfect for  $\frac{1}{10}$ - and  $\frac{1}{8}$ -scale buggies and trucks. The servo reaches maximum torque (60 oz.-in.) immediately off-center, and aggressively maintains the desired steering angle, even over serious jumps and bumps.

**Part no.**—JRPS2700G; **price**—\$184.95.

JR; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.



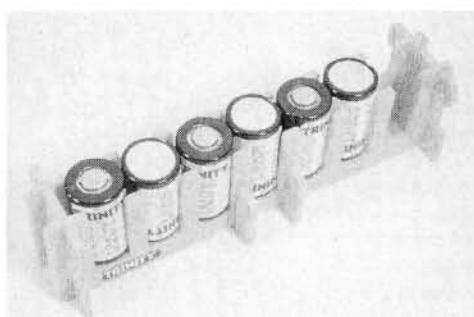
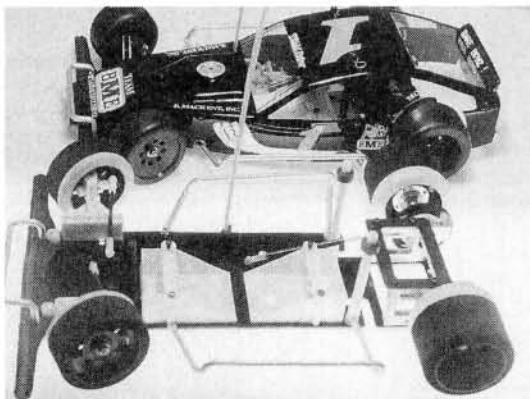
BME

## Bare Bonz Modified

This racecar has a fiberglass chassis, bearings, pro axle and diff components, aluminum hubs, a bumper and nerf bars, a left and right motor bulkhead, an East Coast modified body, ride-height adjusters and much more.

**Part no.**—1000; **price**—\$169.

BME, 1735 Rte. 9 North, Howell, NJ 07731; (908) 866-0595; fax (908) 840-0594.



TRINITY

## Battery Jig

This portable, saddle-pack building jig has a center set of braces that will prevent the jig from becoming distorted and the cells from moving apart as you solder. The jig is specially designed to hold larger 1700 SCRC cells.

**Part no.**—RC5002; **price**—\$9.99.

Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

*Descriptions of the products shown here were taken from manufacturer and/or advertising agency press releases. The information given does not constitute an endorsement by Radio Control Car Action or guarantee product performance or safety. When contacting a manufacturer about any product described here, be sure to say you read about it in Radio Control Car Action.*

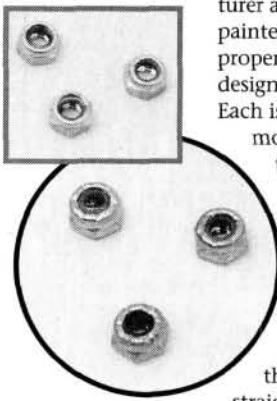
*Manufacturers! To have your products mentioned here, send press releases to R/C Car Action, What's New, 251 Danbury Rd., Wilton, CT 06897-3035.*



# The Nuts and Bolts of Our Hobby

**P**ICTURE TWO cars sitting next to each other on the race track, the drivers waiting for the starting tone. The cars seem virtually identical: the same manufacturer and model, similarly painted bodies and wings, properly chosen tire designs and compounds. Each is poised for a moment, frozen in time. At the tone, however, one car seems to have a slight advantage as it pulls several feet in front of the other car as they both approach the end of the first straight. The car out in front takes the jumps a little better and flies a little farther than its twin. What invisible edge separates the performances of these two cars? It's something you can't see, smell, or taste. It's called weight.

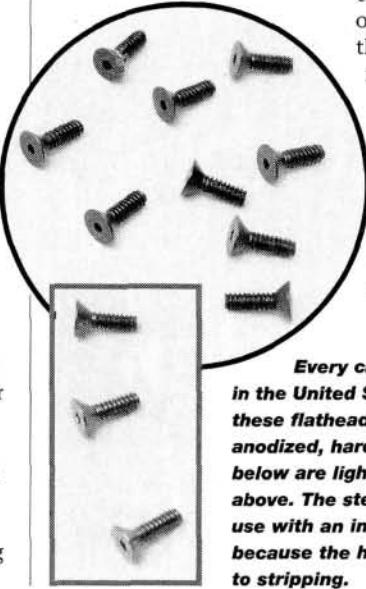
What if I told you that you could easily and inexpensively drop an ounce or two from the overall weight of your truck, buggy, or road car? You'd probably be pretty interested, especially if you then discovered that the weight would come off virtually every area of the car's chassis (removing that much weight from a single area might upset your car's handling). Even if that weight loss means adding lead weights to your car or truck to reach the class's legal minimum, you can place that weight where it will do the most good: in back for better traction or up front for better steering response.



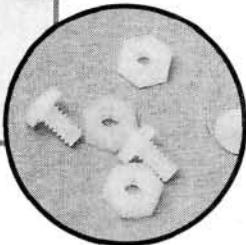
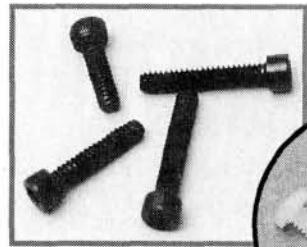
**The big, fat, thick 4-40 nuts are made of aluminum, and they're better than steel nuts. They even have a strip of nylon inside their rims that locks the screw's thread into the nut and prevents it from vibrating off. The locking 4-40 mini nuts top left (available from aftermarket companies like Trinity and BRP\*) are just as strong and weigh less than a quarter of the weight of the stock units.**

## GET FIT KITS

Several major hardware distributors and manufacturers have recently released lightweight nut, bolt and screw kits to fit specific vehicles. All you have to do is buy one bag of parts, and bolt the parts to your car, truck, or buggy as you maintain or rebuild it. Trinity's\* purple-anodized screw kits are available for virtually every popular R/C vehicle on the market. First introduced as a hop-up for Trinity's Evolution 10 and 12 cars, the line of screw kits has been expanded dramatically in the past 12 months. Associated\* and Team Losi\*—long known for their high-quality, off-road truck and buggy kits—have released a series of similar lightweight, aluminum screws and hardware for their own kits. Corally\* cars come pre-built from the U.S. distributor Du-Mor, which also sells an accessory aluminum screw kit that pulls a cool 1½ ounces from an already light, competitive chassis.



**Every car, truck and buggy made in the United States uses a boatload of these flathead 4-40 screws. The anodized, hardened-aluminum ones below are lighter than the steel ones above. The steel screws are easier to use with an inexpensive Allen wrench, because the heads are more resistant to stripping.**



I assembled several of these complete hardware kits and weighed the cars before and after installing the lightweight hardware. The results were all pretty similar, with the complete vehicle losing somewhere between 1 and 2 ounces after the steel parts had been replaced with ones made of lighter aluminum.

So, what's the downside to installing a screw kit? Consider the following:

- If you try to assemble a new kit with these screws and bolts or install a new part during a repair job, you may break off one of these screws while attempting to start a thread. To thread the part, I suggest the use of an inexpensive tap like those found in hobby shops or ones that are available through national distributors, such as MSC\*. This will prevent the screw from breaking off while only halfway inserted. If the screw breaks off, you'll probably wind up buying a new part and a new screw. These hardened screws don't drill out very easily! Come to think of it, it's a good idea to use a tap, even when you use steel screws and bolts.

- It's pretty easy to strip the head of a hardened-aluminum socket or a flat-head screw. To prevent this,

**The steel 4-40 capscrews on the left are typical of what came with Associated buggies and trucks for more than 10 years; they're super-strong, but you can replace them with lighter aluminum parts. To really save a ton of weight, look for places where you can use these white nylon 4-40 nuts and bolts. Bodies, wings, spoilers and some other parts can be attached with these lightweight screws and nuts.**

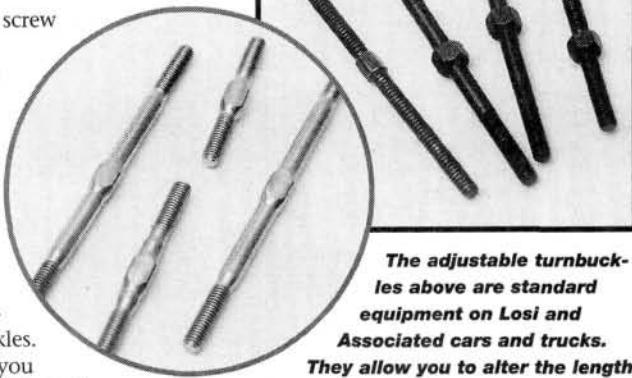
buy a high-quality Allen-key wrench that fits the socket tightly, such as those from Trinity, Wiha\* and Associated.

- Never thread an aluminum screw into an aluminum, titanium, or magnesium part without first coating the screw with some silicone fluid or shock oil. Otherwise, the aluminum screw will gall in the metal part, and it will seize more tightly than you can possibly imagine. This typically happens when you thread an aluminum screw through a pan-car wheel into a lightweight aluminum hub. The result? A ruined hub and a ruined screw!

- Both Losi and Associated recommend that you don't replace the screws that pass through the chassis tub and secure the suspension-arm mounts and transmission to their off-road kits. Screws in those areas take an incredible pounding, and the strength of the steel screws is recommended.

## LIGHTEN THE LOAD

In addition to lightweight screw kits, you can knock additional weight off your ride by taking a close look at what I call "duplicated hardware." For instance, the average off-road car or truck uses six adjustable turnbuckle upper suspension and steering links; most kits come with sturdy but relatively heavy steel turnbuckles. Sure, they do the job, but you can find parts that will do it better! Titanium turnbuckles from Lunsford\* will fill the bill quite nicely; they're light and resist breaking and bending.



**The adjustable turnbuckles above are standard equipment on Losi and Associated cars and trucks.**

**They allow you to alter the length of the upper suspension links without removing the rod ends. The titanium pieces on the left are stronger, lighter and guaranteed not to break.**

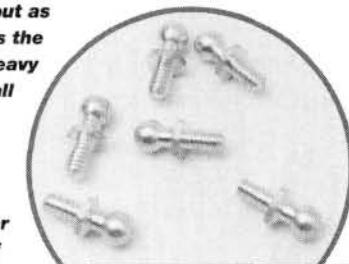
## ROD ENDS

**The smaller, lighter rod ends below will save you additional weight, especially if you're replacing off-road hardware. You may not be able to use these on extremely rough tracks, but they're much lighter than the larger, thicker, longer ones above. Change a dozen of them, and you'll reduce the linkage weight considerably.**



What do those rod ends pop on to? Metal ball ends, that's what! There are another 12 of those, and if you think that those little fellas can't possibly weigh very much, take a dozen of them and bounce them in the palm of your hand. Do the same with some lightweight Trinity aluminum ball ends or some of Robinson's\* titanium ball ends, and you'll be amazed at how light they are. These aren't very glamorous pieces, but they'll save you a bunch of weight.

**The entire pile of lightweight titanium ball ends weighs just about as much as the three heavy steel ball ends below. You have a dozen or more of these on your off-road car or truck—14, if you use rod ends on your steering linkage.**



What is at the ends of those turnbuckles? How about 12 plastic rod ends? If you've been using thick, long rod ends, consider going back to stock-type Associated parts. They'll do a great job, especially if you don't pop them off very often (that's why you have turnbuckles; so you don't have to remove the rod ends). They weigh less than the thicker ones, even though there are a dozen of them.

## FIT AND TRIM

These screw sets don't look like very much when you buy them: a small handful of colored nuts, bolts and screws. They're a pain to install, too, unless you have to take your ride apart anyway, for some reason. The enlightened racer, however, quickly realizes that reducing overall weight by more than an ounce can get him to the finish line ahead of the competition.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.

# TEAM SECRETS

## BACK IT UP!

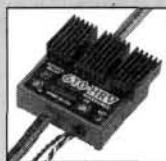
*Ever wanted to back your car out of a tight situation or messy crash, without interrupting your fun. It's time for reverse!*

With the ability to recreate fast-action stunts and maneuver around the track much easier, you'll wonder why you haven't added a reversible speed control to your R/C collection before.

Novak Electronics manufactures two different reversible electronic speed controls, the **610-HRV** and the **Rooster**.

It has been advertised by one ESC manufacturer that "old style forward and reverse [ESCs] require that you slam [the car] into reverse while still going forward in order to slow the car down, and then finally go into reverse" and that they solved this problem by incorporating fully proportional throttle and brake control. Well, it seems that what they meant to say is that **their** old style reversible speed controls had this problem. **Novak's reversible speed control's have always had fully proportional brake, forward, and reverse.**

The **610-HRV** reversible speed control is capable of running 6 to 10 cells, with stock or modified motors. HYPERFET transistors deliver excellent performance in a small package. In addition, the Reverse Time Delay feature allows you to choose from 0-3 seconds when shifting from brake to reverse. The **610-HRV**...now with **purple** heat sinks!



The **Rooster** reversible speed control can be used with 6 or 7 cells, stock or mild modified motors. It has equal performance in both forward and reverse, and features One-Touch Set-Up™. Radio Priority Circuitry™ is employed to allow you to maintain car control even after the batteries have dumped.

Both Novak reversible ESCs include thermal protection, BEC circuitry with overload protection, and high frequency operation, which allows for smooth throttle response and extended motor life.

Check out Team Novak's **610-HRV** and **Rooster** at your local hobby store! One is right for you.

REVERSIBLE ESC COMPARISON CHART		
	Rooster	610-HRV
On-Resistance ( $m\Omega$ ) <sup>†</sup>	18.0	6.5
Rated Current (max A) <sup>†</sup>	100	120
Braking Current (A) <sup>†</sup>	100	60
Motor Recommended	Stock or MM <sup>‡</sup>	12 Turn Max <sup>‡</sup>

<sup>†</sup>Transistors rating at 25°C junction temperature. <sup>‡</sup>Mild Modified.

<sup>†</sup>Maximum turn motor with 6 cells. Maximum 13 turns when using 7 cells, 14 turns at 8 cells, 15 turns at 9 cells, and 16 turns at 10 cells.

**NOVAK ELECTRONICS, INC.**  
18910 Teller Avenue, Irvine, CA 92715  
• (714) 833-8873 •

Advertisement



TAMIYA



# TAMIYA TAKES ON THE WORLD'S TOP TOURING CARS

by Frank Masi

**T**HERE'S NOTHING WRONG with being known as the "king of entry-level R/C." But when you notice that many of your customers graduate to other companies' products once they've cut their teeth on yours, it's time to take

## Gearboxes

The TA03's most radical departure from conventional touring-car design is its fully ball-bearing-supported drive system. A single, toothed belt connects front

# TA03F-Pro

action. Tamiya\* products are renowned for their beautiful scale looks, easy assembly and user-friendliness. Nearly all the hobbyists I know started with Tamiya kits, but when they wanted to get into racing, they looked elsewhere.

Tamiya hopes that its all-new TA03F-Pro 4WD touring-car chassis will keep owners of its entry-level TA01 and TA02 chassis in the Tamiya line when their skills progress. And because it features full ball bearings, front and rear ball diffs, efficient belt drive and a radical front-motor design, Tamiya customers won't be the only ones who give the TA03 serious consideration.

As impressive as the TA03 sounds, there are sure to be skeptics who believe that Tamiya isn't capable of producing a *truly* competitive machine on a par with those from Yokomo\*, HPI\*, Kyosho\*, etc. So this review will not only focus on the TA03's unique features, but also on how it compares with the other pro-type racing chassis against which it will compete both on the track and for your hard-earned dollars.

and rear gearboxes—pretty standard stuff—but the motor is mounted at the front of the car in a similar fashion to Tamiya's own front-wheel-drive chassis. Tamiya engineers claim that this will give the 03 lots of steering and class-leading acceleration because so much of the weight is over the front wheels.

Up front and in back, the TA03 has adjustable ball diffs that have lightweight, aluminum pressure plates and pre-assembled thrust bearings for easy assembly. Each diff is installed through the bottom of a molded gearbox, then a



# KIT FEATURES

plastic access hatch that doubles as the suspension-arm mount is used to close the assembly. The gearboxes are bolted to the main chassis plate. Removing the 03's diffs for maintenance—an easy task with the 01 and 02—will unfortunately require disassembly of a good portion of the chassis. Stainless-steel drive shafts transmit power from the diffs to all four wheels.

The front gearbox also serves as the motor mount, and, unlike all previous Tamiya touring-car designs, the pinion- and spur-gear's mesh is minutely adjustable, thanks to slotted motor-screw holes and an easy-access gear cover. The design of the TA01's and 02's motor mount, through which gear mesh is preset for each pinion size, is better suited to beginners who might set mesh incorrectly. The TA03's motor mount will appeal to the experienced racer who is more skillful at setting gear mesh precisely.

The TA02's transmissions comprise a somewhat complex number of gears, countergears and bevel gears. By contrast, each of the TA03's two gearboxes contains only the differential and a simple countergear—a much more efficient system. The ball diffs are mounted low in their gearboxes, as close to the chassis as possible, to provide a low center of gravity.

In the

front gearbox, the motor drives a fine-tooth, metric 64-pitch spur gear, which in turn drives the countergear, the diff and an external pulley for the drive belt. In fact, the only portions of the TA03's drive train exposed to the elements are the belt and its two pulleys. This means that the gears are all but impervious to sand and debris.

Power from the front gearbox is sent to the rear 'box via a glass-filled, toothed, rubber belt. Tamiya supplies belt pulleys in two sizes—15- and 16-tooth—so that you can select the 03's drive characteristics. If you install same-size pulleys on both gearboxes, the front and rear wheels will be driven at the same rate. Installing a larger pulley on the front gearbox causes the rear wheels to turn faster than the fronts, and this gives the car more on-power steering. A larger pulley on the rear gearbox lets the rear wheels turn more slowly than the fronts, and this increases stability when the car exits corners. Changing pulleys is a simple matter of undoing one setscrew, then sliding

the pulley and its aluminum hub from the gearbox shaft.

A separate, ball-bearing-equipped pulley is attached to the top of the 03's rear gearbox to keep tension on the belt and prevent it from skipping during hard acceleration. The tensioner can be attached in one of three positions so that it can increase tension as the belt becomes stretched with use.

## Belt drive



The TA03's fully independent suspension comprises four "Delta box" H-arms, one attached to each corner of the chassis. The arms are fixed at a rake angle of 3 degrees; this provides 3 degrees of rear-suspension anti-squat (for better acceleration) and 3 degrees of front-arm kick-up (for improved rough-track handling and less dive during braking). The front steering uprights are leaned rearward an additional 5 degrees; this, combined with the 3 degrees of

front kick-up, gives the 03 about 8 degrees of caster for improved turn-in to corners. The H-arms also supply the rear wheels with about 2 degrees of toe-in.

Plastic oil-filled shocks, mounted nearly vertically, connect the suspension arms to the chassis' shock towers. The shock's vertical position, in conjunction with the included front and rear swaybars, keeps the chassis nice and flat during cornering and helps it to straighten out quickly when the car exits a turn.

The 03's molded-plastic hubs place the axles directly in line with the diff outdrives for optimum drive-train efficiency, while molded-plastic camber links secure the tops of the rear hubs and the front steering uprights to the main chassis. Although you can't alter camber because the links aren't adjustable, I found that the factory setting (about 1½ degrees of negative camber) worked well under all circumstances. Installing adjustable upper links would be quick and easy.

# TAO3F3



## LIKES

- Tamiya quality—there's none better.
- Great instructions.
- Excellent handling with front-motor design.
- Sealed drive system can't be damaged by small pieces of debris.
- Low CG keeps the car on its tires.
- Low-maintenance belt drive.



## DISLIKES

- Accepts only stick packs.
- Plastic motor mount doesn't dissipate motor heat.

## SPECIFICATIONS

SCALE	1/10
LIST PRICE	\$356
<b>DIMENSIONS</b>	
Length overall	15.19 in.
Wheelbase	10.1 in.
Width (F/R)	7.19 in.
WEIGHT (gross, RTR)	3 lb., 8.7 oz.
<b>CHASSIS</b>	
Type	Upper/lower plates
Material	Fiberglass-reinforced plastic (FRP)

## DRIVE TRAIN

Type	Twin-gearbox, belt-driven 4WD
Primary	Pinion/spur
Transmission	Stainless-steel dogbones/axles
Differential(s)	Adjustable ball diffs (2)
Slipper clutch	None
Bearings/bushings	Maintenance-free ball bearings (26)

## SUSPENSION (F/R)

Type	Independent: lower arm w/upper link
Damping	Oil-filled, coil-over shocks (plastic)

## WHEELS (F/R)

Type	Molded 5-spoke
Dimensions (DxW)	1.89x1.02 in.

## TIRES (F/R)

Rubber slick w/inner sponge

## ELECTRICS

Not included

## Building & Setup Tips

The TAO3, like all Tamiya kits, sets the standard for ease of assembly, clear instructions and superb parts fit. To go from kit to rolling chassis took roughly six hours; you can rush and complete the chassis in less time, but building a Tamiya kit is so much fun that you'll probably want to take your time.

- When you build the ball differentials (Step 1 in the instructions), note that there are two sizes of concave washers (Tamiya calls 'em "disk springs"). The larger washers go on the 4mm bolt first, followed by the thrust bearing (use plenty of diff grease on this bearing) and then the smaller washers.
- During assembly, I noticed that all of the 3mm self-tapping screws could be threaded into the plastic pieces with less effort than was needed with previous Tamiya kits I've built. Tamiya must have either changed the type of screw or enlarged the pilot holes in the plastic pieces.
- The recommended 3x15mm self-tapping screws are too long to be used to attach the camber links to the front damper stay (shock tower, Step 4), and they protrude too far when threaded in. I used 3x12mm screws instead.
- The instructions don't say which size pulley to use during Step 6 (assembling the belt pulleys). I recommend that you use a 16-tooth pulley for both the front and rear for the best handling on most surfaces.

- I geared the Trinity Team Edition 15-turn motor using Tamiya's 0.4 (metric equivalent to 64-pitch) 23-tooth steel pinion. This provides a ratio of 7.34:1. Tamiya offers these pinions in sizes ranging from 20 to 29 teeth. Be sure to install the supplied motor plate in your motor before assembly. Otherwise, debris can be sucked in through the motor and find its way into the gearbox.
- Take care not to overtighten the screws that secure the gearshaft cover (Step 13). Doing so will distort the plastic gearbox and cause the gears to bind.

- When you assemble the shocks (Step 17), use a shock-seal grease such as Green Slime from RCPS\*. Also, when you install the shock rod end, don't grip the shock's shaft with pliers as shown in the instructions. This will scratch the shaft! Wrap the shaft in a rag first, then grip it. Use the one-hole pistons in all four shocks, then fill them with Associated\* 40WT oil or equivalent (the kit-supplied oil works fine, too).

- Install Tamiya's optional blue springs (slightly firmer) on the front shocks, and use the kit-supplied silvers in the back. Use one V7 spring spacer on each rear shock and one V7 and one V6 on each front shock.

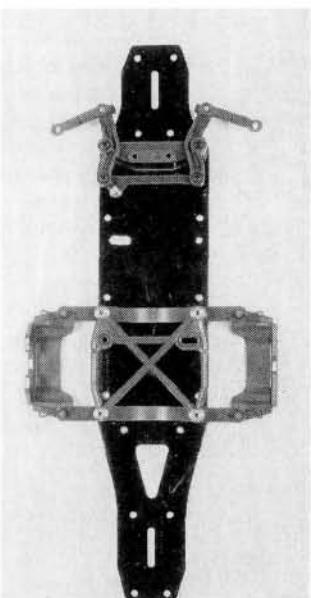
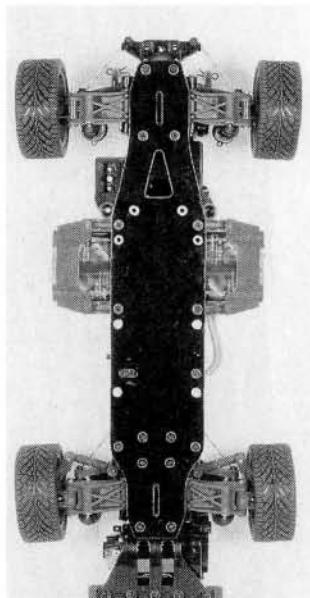
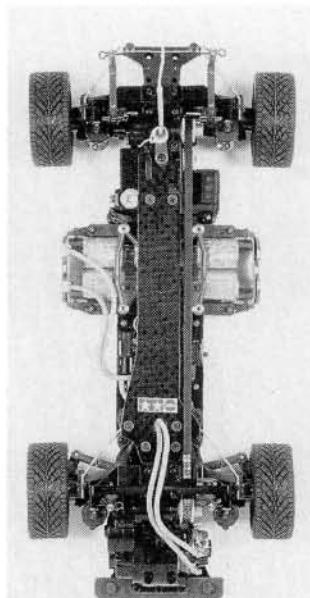
- Assemble the steering tie rods so that the front wheels point straight ahead with neither toe-in nor toe-out.

- And of course, glue the tires firmly to the rims so that the tires' sidewalls can't pull away from the rims during cornering. I used Trinity's thin Tyre Fix with pleasing results.



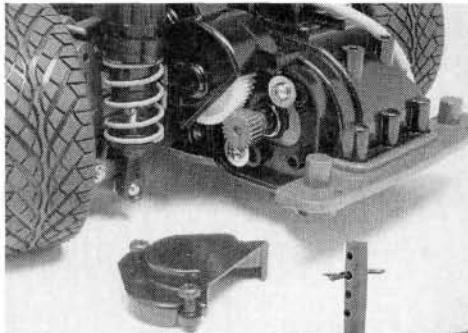
To control the TA03, Futaba's new "big gun"—the Magnum 3PJ—was used. This mega-radio features eight-model memory, digital trim settings and superb ergonomics.

Overall, the TA03 is a very impressive package. In my opinion, it is one of the best-performing narrow touring cars available.

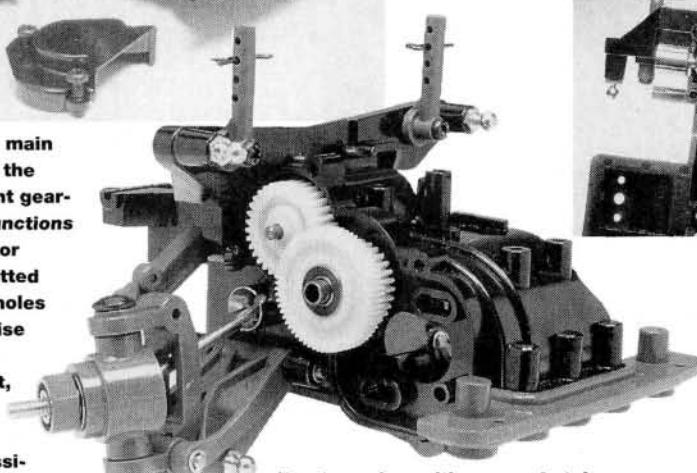


Above left: the TA03 is Tamiya's first-ever competition touring car chassis. Among the car's more interesting features is its radical front-motor layout and simple belt drive. Above center: the TA03's underside showing the one-piece, FRP chassis plate and four-wheel independent suspension.

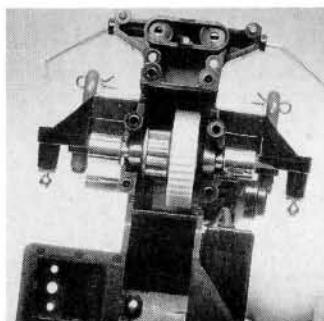
Above, right: this overhead view of the chassis shows the battery cradle in place (note that the cradle can be moved forward to provide more steering and less rear traction). The steering system is a simple dual-bellcrank setup, which provides excellent response with little slop.



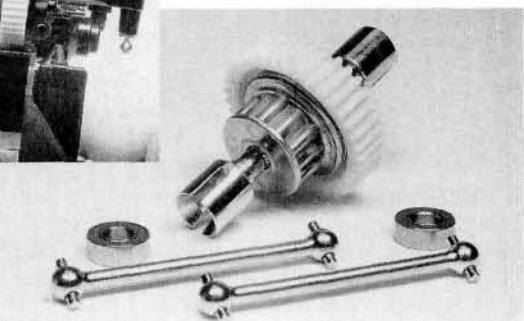
Above: the main housing of the plastic front gearbox also functions as the motor mount. Slotted mounting holes allow precise gear-mesh adjustment, but the plastic doesn't dissipate the motor's heat as well as aluminum.



Front gearbox with access hatches removed. The spur gear uses 0.4 metric-pitch teeth for a larger range of possible gear ratios to suit any motor and track combination.



Left: this underside view of the rear gearbox shows the installation of the ball diff. Unfortunately, much disassembly of the TA03's chassis is required to access the diffs for maintenance or rebuilding.



You'll find one of these newly redesigned ball diffs in both of the TA03's gearboxes. The diffs feature new, lighter aluminum pressure plates and pre-assembled thrust bearings. Stainless-steel dogbones and maintenance-free, sealed ball bearings are indicative of the 03's racing promise.

#### INSTALLING ELECTRICS

The dual-plane FRP chassis provides ample room for radio gear and electrics; however, to keep the 03's center of gravity as low as possible, I mounted everything on the main chassis plate and kept the upper plate clear of anything that might raise the car's CG.

The TA03 comes with all of the hardware, e.g., mounting posts and steering arms, with which to install most popular brands of servo. I chose an Airtronics\* 94737, and fitting it to the chassis was

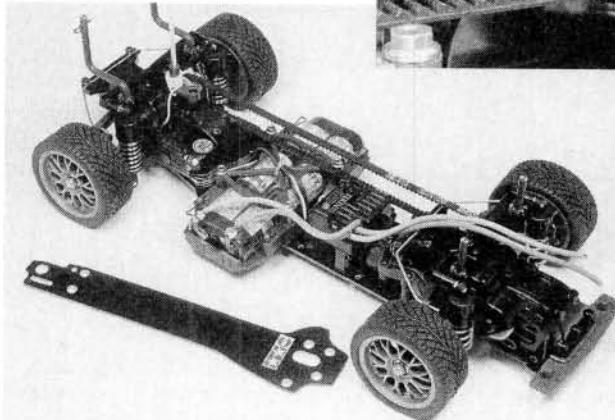
painless. Atop the steering servo, I installed a Tekin\* G-12c ESC. This position ensures a low CG, but the ESC receives virtually no cooling airflow. Because of the G-12c's CoolSwitch circuitry, this wasn't a problem. Any non-heating ESC, such as other Tekins with the CoolSwitch feature or any of Novak's\* Polar Drive™ ESCs, will function well in this location. If your ESC gets too hot, install it on the upper chassis plate as shown in the TA03's instruction manual.

This is a racing vehicle, so I tested it

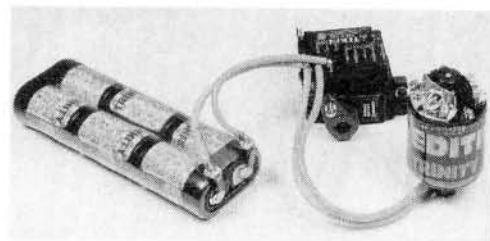
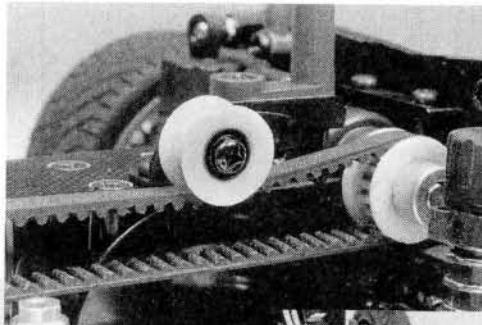
using a state-of-the-art racing motor: a 15-turn, Trinity\* Team Edition, epoxy-balanced motor. I hard-wired the motor to the ESC using Trinity's green and pink, silicone-jacket high-temp wire. The Tekin's solder-on posts, of course, made this easy.

The 03's battery mount can accommodate only stick-type packs (an optional carbon battery plate set is available to use with side-by-side packs). I used Trinity's 30A World Tech cells, which are top-of-the-line and perfectly suited to the motor I was using.

Right: a ball-bearing-supported pulley serves as an effective belt tensioner. The pulley can be attached in one of three positions to increase or decrease tension as the belt becomes stretched.

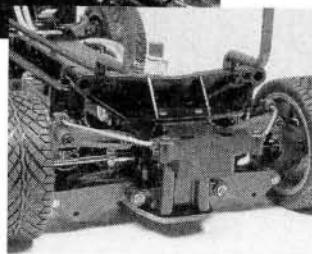


With the upper chassis plate removed, you can see the simple arrangement of the battery and radio gear. This setup provides the TA03 with a very low CG for exemplary cornering.



Above: what's a racecar without racing-type electrics? Horsepower from Trinity's 30A World

Tech cells and a Team Edition, epoxy-balanced 15-turn motor provides mondo punch and good top speed. An Airtronics 94737 steering servo and Tekin G-12c ESC finish off the package. Left: the rear of the TA03 features a gearbox similar to that of the front and also has an independent H-arm suspension, a swaybar and vertically mounted shocks.



At left is the TA03's five-spoke wheel on which the kit-included slick tire is mounted. Pro-Line's new Sedan Speed Hawg tire in M2 (right) is shown mounted on Tamiya's sharp-looking BMW 318i wheel.

While I was working on this review, I received one of Futaba's\* new Magnum 3PJ super-radios. I installed the FP-R113F mini-receiver on the right side of the TA03's rear gearbox using double-sided foam tape. This keeps the receiver low, and it's also about as far away from the motor (and glitch-causing motor noise) as possible.

#### BAVARIAN BODYWORK

The TA03F-Pro comes in kit form and without body or electrics (motor, speed control). Because it shares its critical dimensions with the TA02 chassis, almost every Tamiya body shell (or any that fit the 02) will drop right onto the 03. I chose Tamiya's new BMW 318i body shell with BBS-style wheels. Painting the shell with Pactra's\* Sprint White took about 20 minutes, but applying the dozens of supplied decals took considerably longer. The results, though, seem well worth it; this is a stunning body!

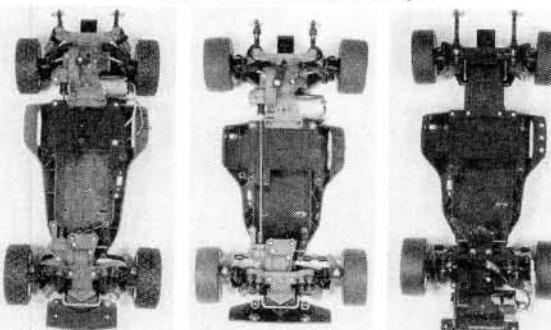
#### PERFORMANCE—WHAT YOU'VE BEEN WAITING FOR!

To test the TA03, I constructed an L-shaped roadcourse in a neighboring parking lot. The surface was typical Connecticut asphalt (abrasive and bumpy), and a portion of the track contained some pretty rough patchwork. To get a baseline for the 03's performance,

#### THE 03's FAMILY TREE

Touring cars aren't new to Tamiya. In fact, it wouldn't be inappropriate to say that Tamiya invented the class.

Here's a little family history:



**TA01 4WD  
1992**

Nissan Skyline GT-R reviewed in our June issue.

**TA02 4WD  
1994**

Alfa Romeo 155 V6ti reviewed in our May issue.

**TA02 FF FWD  
1994**

Castrol Honda Civic reviewed in our July issue.

the first runs were made using the factory-recommended setup with Tamiya's optional blue springs up front and the kit's silver springs in back.

During the first few runs, the 03 impressed me with its remarkable poise and stability. For a narrow touring-car chassis, it's incredibly sure-footed over rough pavement, even while cornering. The 03's low center of gravity made it seem almost immune to rolling over in sharp turns. This can be attributed in part to the kit's slick tires, which slid a bit during hard cornering and scrubbed off enough speed to prevent the car from tip-

ping. Acceleration was lightning-fast and without dramatic course deviations, and braking—both in a straight line and during cornering—was sure and predictable.

Most important, the 03 exhibited none of the front-wheel-drive cars' tendency to become "tail-happy." I had expected such a propensity because of the 03's front-motor layout, but instead, its rear tires remained firmly in line with the front end, even in bumpy corners. How did they do that?

The Trinity 15-turn motor's power, however, created a bit of a problem when the TA03 accelerated briskly from sharp turns. The rear tires literally tried to pass the fronts (I had set the belt pulleys so that the rear wheels were driven faster than the fronts). Pro-Line\* had sent me a set of the new Sedan Speed Hawgs in the super-soft M2 compound (part no. 1086M2), and bolting them to the 03 seemed to fix the problem. In fact, overall handling improved markedly with the Speed Hawgs, although their sidewalls tended to tuck under the wheels' rims during hard cornering, and this caused the rims to be chewed up by the pavement. Later, I found that some of the tire's beads had become unglued from the wheel. Re-gluing the tires to the wheels fixed this problem for subsequent runs. When you use really soft tires, check your glue joints after each run!

During one run, whenever I applied



## Factory Options

The TA03 is such a new chassis that there weren't many hop-ups available as of this writing. But Tamiya announced several items for the TA03 at the '96 Shizuoka Hobby Show. They are:

■ Hollow carbon gear shaft—part no. 53260. Lightweight and strong; replaces the hollow steel pipe that supports the spur gear.

■ Carbon battery-plate set—53261. Reduces weight and allows the use of non-stick-type battery packs. Consists of a carbon plate and aluminum battery posts. Batteries must then be taped into place.

■ 0.4 steel pinion gears. Available in 20- to 29-tooth sizes to allow precise gearing of all types of racing motors.

## SECOND OPINIONS



I was always impressed with the Tamiya TA02, but when I started to drive more of the race-oriented touring cars that began to hit the market, my opinion changed, and I began to think of it as a good entry-level car. The 02 was easy to work on and handled well, but its performance was definitely limited by the drag in the drive-train system. Tamiya hoped that the TA03 would prove to the world that it could produce a full-blown racecar with the high quality that we've all come to expect. I believe that Tamiya accomplished its goal. The TA03 retains every good feature of the TA02 and adds quite a few more. When I first drove Frank's 03, I found myself saying, "This is a Tamiya car?" I was pleasantly surprised. The car is very nimble and corners exceptionally well; it's planted. Its on-power driving prowess at the very least equals that of my Yokomo YR-4. I'll be the first to admit that I was slightly skeptical, and I honestly didn't expect Tamiya to pull through with a full-blown racer. But it has, and it has done so rather well. After spending some stick time with this ride, I can confidently say that it has what it takes to be a top contender in our upcoming touring-car shootout. —John Howell

The moment the new TA03 arrived at our office, I couldn't wait to try it. I have to admit that the forward-mounted motor made me a little skeptical at first. I thought the car would push like most of the FWD cars I have driven. When Frank handed me the radio and I goosed the trigger, I realized that this car was unlike anything I have driven. It took me a few laps to get used to its handling, but within seconds, I had the car dialed. Here are my impressions:

- In the corners, the car pushed severely when braking. This is not a problem, though, because the car has more than enough steering to handle the tightest hairpin turns without even using the brakes. All I had to do was decelerate a tad before it entered the corner, then hit the gas as the car went through it. There was no way to break the rear end free, as I can on most of the other 4WD sedans I have driven.
- The car turned tightly in both directions—an indication that Tamiya designed it very well (no tweak was evident).
- The suspension did an excellent job of soaking up the mild imperfections on the road. I even hit a sewer cap at full speed while cornering, and the car didn't lose its composure—very impressive.
- The drive train seems very refined, and the power transfer is extremely smooth when you consider that the car is not equipped with universal drive shafts.

I honestly believe that, right out of the box, this car has what it takes to do battle with today's high-zoot touring sedans. I can't wait to see which hop-ups Tamiya has in store for us. —George Gonzalez



## THE COMPETITION

	Kyosho TF-2	Yokomo YR-4	Tamiya TA03	HPI RS4	Yokomo YR-4M	Tenth Technology Predator DTM	Schumacher SST 2000
Wheelbase	10.3 in.	10.25 in.	10.1 in.	10 in.	10.32 in.	10 in.	10.05 in.
Width (F/R)	8 in./8 in.	7.13 in.	7.19 in.	8.65 in./9 in.	6.5 in./6.25 in.	7 in./7.25 in.	7.28 in./7.28 in.
Weight	3 lb., 4 oz.	3 lb., 3 oz.	3 lb., 8.7 oz.	3 lb., 5 oz.	2 lb., 12 oz.	3 lb., 5 oz.	3 lb., 4 oz.
Diff type	Gear	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Graphite/alum.	Fiberglass	FRP**	Black fiberglass	Graphite	Resin composite	Fiberglass
List price	\$259.99	\$269	\$356	\$298	\$425	\$479	\$319.50
Available at*	\$199	\$209.95	n/a	\$199.99	\$319.95	\$320	\$191.70
Issue reviewed	8/95	8/94	10/96	5/96	9/96	7/96	TC

\*Prices vary with location. \*\*Fiberglass-reinforced plastic.

the brakes, I noticed a peculiar noise coming from the front gearbox. Of course, I ignored it until the 03 began to make the same noise under acceleration. The motor had apparently slipped in its mount and had caused the pinion to back away from the spur gear—grindomatic! Hmmm, I know I tightened the motor screws. What gives? Easy answer: heat softens plastic. Electric motors get very hot, and the 03's motor mount is, essentially, part of the plastic front gearbox. I will be the first in line to purchase an aluminum replacement when some savvy aftermarket company makes one. I replaced the spur gear and *really* tightened the motor screws. This seems to have fixed the problem.

Next, I replaced the 15-tooth rear belt pulley with a 16-tooth one. (I had been using a 16 in front and a 15 in back to over-drive the rear wheels.) This equalized the front/rear drive and made the 03 more stable under hard acceleration. Cornering remained unchanged; the 03 has enough steering to negotiate even the

tightest of tracks, but it doesn't get squirrely unless pushed to the absolute limits of adhesion.

During the last run, I removed the rear swaybar to see whether that would give the rear tires more bite during off-power cornering (on more than one occasion, during a fast, sweeping turn, the rear tires slid out when I lifted the throttle). I noticed no change in cornering, but the car now seemed to require more time to straighten out from directional changes, and it wasn't as nimble during transitions from left to right. The swaybar went back on.

### FINAL THOUGHTS

Overall, the TA03 is a very impressive package. In my opinion, it is one of the best-performing narrow touring cars available. This means that, yes, it's as good as the Yokomo YR-4, the HPI RS4, the Tenth Technology\* Predator, etc. I would rate the 03's drive system right up there with that of the industry-standard Yokomo, and the Tamiya's is sealed against dirt, so you can

run this car on sandy pavement without worry.

And make no mistake, the front-mounted-motor design of the TA03 is not a mere curiosity. It accomplishes what Tamiya says it does—providing improved acceleration and steering—and it does so without creating a front-heavy feel when the car is driven.

The TA03 has few drawbacks besides the problems with the plastic motor mount (plastic doesn't conduct heat very well) and a battery mount that accepts only stick packs (didn't you guys say this was a racing car?). It's a solid and durable performer that I'd pit against any other narrow touring car—except maybe the Yokomo YR-4M, which seems to be closer to a pan-car chassis than a touring car. But with the addition of a few carefully selected and inevitable hop-up parts, who knows?

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.

CAR ACTION  
**THRASH TEST**  
1/8 SCALE GAS



The economical  
**1/8-scale buggy**  
with top-of-the-line  
**performance**

# THUNDER TIGER Mirage Pro

by A.R. Flatbush

**T**HUNDER TIGER Racing\* has earned its reputation by building dependable, inexpensive R/C aircraft, boat and buggy engines, but this Taiwan-based company has also jumped into R/C cars in a big way! Thunder Tiger unleashed the 1/10-scale 4WD Challenger Pro (tested in the May '96 issue) on an unsuspecting world and has now entered the 1/8-scale market with its 4WD Mirage Pro. Clearly, Thunder Tiger wants to show the world that it should be taken seriously. The Mirage comes loaded with features found on other top-shelf buggies as well as goodies you won't find on some other models. It offers topnotch components at a reasonable price, and it could set a new performance standard for affordable 1/8-scale off-road cars!

## KIT FEATURES

**Chassis.** An anodized, 3mm, aluminum plate serves as the main frame, and all mounting holes are countersunk to provide a smooth undercarriage. Molded plastic side guards add stiffness to the frame and prevent dirt from accumulating in the car. The overall layout is much like that of Kyosho's\* Inferno MP-5: the engine and fuel tank are on the left, and the servos and battery/receiver box are on the right. But the Mirage doesn't have any built-in front kick-up.

The front and rear diff/suspension pods are attached to the chassis plate with four screws, and the front diff bulkhead and servo-saver steering are supported by an

upper plate. Front and rear nylon bumpers protect the diffs during races (and crashes!).

**Drive train.** Three planetary-gear diffs distribute power from the clutch bell and spur gear to the wheels via drive shafts; this is standard 1/8-scale 4WD practice. What isn't so standard? The diff housings are aluminum, whereas those in most kits are plastic, and the front/rear bevel-drive gears are hardened steel. The center gear is wider than most and also made of steel, and the lightened clutch bell is trick, too. The front and rear diff cases are split so that you can remove the diffs without disassembling either suspension pod. Universal shafts are standard up front while dogbones drive the rear wheels.

Dogbones transfer power from the center diff to the front and rear diffs. The independent front and rear disk-brake system is adjustable, so you can dial front-to-rear braking bias according to your driving style and track. The clutch bell has 14 teeth, and the steel main gear has 46 teeth for a reduction ratio of 3.29:1. The 18 ball bearings are interchangeable with those of Kyosho's popular Inferno.

**Front suspension.** Long, molded, suspension arms and the medium-length shocks (1.5-inch body and 1.75-inch shaft) provide 1 1/8 inches of front-wheel travel. A 3.5mm anodized-aluminum plate is bolted to the front diff housing to prevent the front arms from flexing. The plate also fixes caster for the front end. The 3mm-thick aluminum shock tower provides eight upper mounting positions while there are two mounting choices on

the lower arms. There are four mounting options for the front camber rods, so you can raise or lower the front roll center to fine-tune your steering balance.

The shock finish is excellent, and the rubber-sealed boot extends the shock's life by keeping dirt out. Be sure to brush out the spring cups after every session, or dirt will accumulate and be forced into the seals when the suspension bottoms out. The preload spacers clip onto the shock, so there's no binding as the piston goes through its range of travel (there can be, with certain clamp-type retainers). The shocks gave me nothing to snivel about, except that the top cup/seal could be more pliable, and that would offer a smoother ride.

## SPECIFICATIONS

SCALE ..... 1/8  
LIST PRICE ..... \$499.99

### DIMENSIONS

Length overall ..... 19.1 in.  
Wheelbase ..... 12.5 in.  
Width (F/R) ..... 12.4/12.5 in.

WEIGHT (gross, RTR) ..... 7 lb., 12 oz.

### CHASSIS

Type ..... Stamped plate  
Material ..... Aluminum

### DRIVE TRAIN

Type ..... Shaft-driven 4WD  
Primary ..... Clutch bell/spur gear  
Transmission ..... Front universal shafts/  
rear dogbones  
Differential(s) ..... 3 planetary-gear diffs  
Bearings/bushings ..... 18 ball bearings

### SUSPENSION (F/R)

Type ..... 4W independent w/  
lower A-arms and  
upper adjustable links  
Damping ..... Aluminum, oil-filled,  
coil-over shocks

### WHEELS (F/R)

Type ..... One-piece plastic  
Dimensions (DxW) ..... 3x1.75 in.  
Tires (F/R) ..... Mini-pin spike/  
X-pattern

### POWERPLANT

Engine ..... Thunder Tiger Pro .21B-R(P)  
Pipe ..... Thunder Tiger tuned  
Carb ..... Thunder Tiger Slide Valve

PHOTOS BY A.R. FLATBUSH



*In this view, you can see that the Mirage Pro is laid out in typical 1/8-scale fashion. It has an inline drive system, a 125cc fuel tank, a sealed receiver/battery box and a multitude of other hot features.*



## LIKES

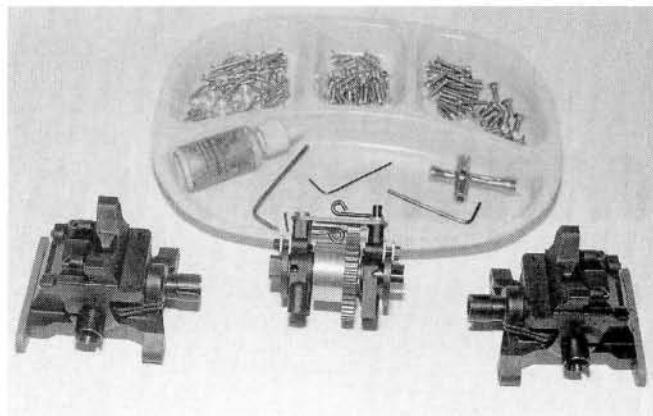
- Full ball bearings.
- Quick-adjust turnbuckles.
- Excellent anodized shocks with seal covers and preload spacers.
- Helpful manual and teardown blueprint.
- Aluminum wheel hubs that accept OFNA\* and Mugen\* wheels.
- Sealed receiver/battery box.
- Sharp-looking blue-anodized aluminum parts.
- Front and rear swaybars.
- Lightweight clutch bell and aluminum diff housings.
- Excellent overall finish at a great price.



## DISLIKES

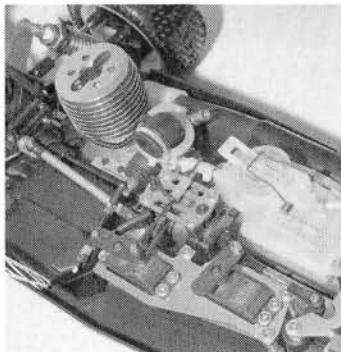
- My fuel tank was defective (but fixable).
- Flat chassis design needs front and rear stiffeners to fight flexing.
- Had to "Dremel" servo-saver upper plate to achieve full steering lock.

Check out the three planetary gear differentials. Both the front and rear diff cases are aluminum. The Mirage Pro's competitors all use plastic diff cases. In the background, note that I use a tray to separate my screws. This makes the assembly go much more smoothly.



• Steering system. The Mirage uses steering bellcranks with a drag-link plate. Two bellcrank mounts are drilled at the end of the plate for the steering rods, but only one of the holes is countersunk. You can use the other mounts to alter Ackerman (the inside tire turns more than the outside to pull the car around corners). There's virtually no toe-in/out deviation as the front suspension goes through its travel and no noticeable bump-steer.

The molded plastic bellcranks ride on bushings instead of bearings, and the right crank is a spring-loaded, two-piece servo-saver. Operation is smooth, but the drag-



**The Mirage Pro comes with a Thunder Tiger .21B-R(P), which provides plenty o' power. I used two Futaba S9301 servos for the steering and throttle/brake duties.**

link can rub against the front diff when the servo-saver deploys. Chassis flex can cause the left bellcrank to make contact with the fuel tank, too. The anodized servo-saver upper plate is notched to allow clearance for the steering linkage, but not enough. I had to grind away some material with a Dremel Moto-Tool to achieve full-lock turning to the left.

• Rear suspension. Long shocks and H-arms provide 1 5/8 inches of rear-wheel travel. The rear shocks have 2 1/8-inch shafts and 1 15/16-inch bodies, and they

have all the cool features of the front shocks. A large, 3mm, aluminum shock

## Building & Setup Tips

The Thunder Tiger Mirage's overall quality is very good, but careful assembly will make it better still on the track. Take your time when you assemble the kit, and you'll reap the rewards with easier tuning and faster lap times. Here are my observations and deviations:

• The directions are straightforward and have helpful photographs and schematic diagrams. Read the entire manual before you begin work.

• Carefully cut all the plastic parts off the tree. Any flashing left on shock pistons or suspension arms can adversely affect action and handling. Use a cloth to protect the shock shafts when you thread on the lower mounts, and oil the

threads before you pass the shafts through the seals. One rear shock spring was 2mm shorter than the other, so I used an extra 2mm preload spacer on that shock to even out the ride.

• Do not overtighten screws that tap into plastic because this can distort the part or strip it completely. The Mirage uses backup nuts instead of circlips on suspension pins, so use Loctite\*, and don't tighten so much that it binds the arms and creates friction during suspension movement!

• Grease is supplied to pack the three diffs. I set up the front diff light and the rear diff medium. I packed the center diff so that grease shot out of every orifice as I tightened the case-halve screws. Also, when you tighten the out-drives, don't allow them to rub the diff case. I place a small piece of

foam in each outdrive to cushion the dogbones.

• If you use the front and/or rear swaybars, be sure to install them when you assemble the respective bulkhead/suspension pods.

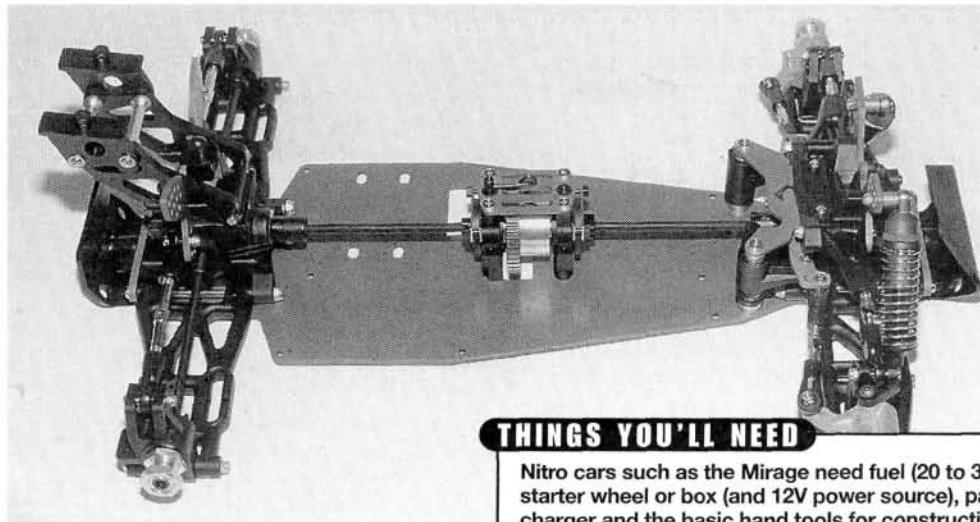
• Although the formed chassis guards stiffen the 3mm flat aluminum main frame somewhat, there's still a lot of flex at each end. I adapted Duratrax's Inferno rear chassis brace to fit the Mirage, but it still needs a front-to-center diff plate.

• The rear brake actuator linkage passes dangerously close to the fuel-line spigot, so I protected the line with a plastic cover. Also, the pipe almost touches the fuel tank, so I placed a piece of motorcycle Moto Tie on the tank to insulate it from the heat. You can do the same with a Coke can and a piece of two-sided tape. I also had a

problem with the fuel filler seal. There was some slop in the flip-top's mounting screw, so I drilled a hole and used a setscrew to hold the flip-top squarely against the lip.

• On left turns, the steering linkage hit the servo-saver upper brace, and this cut down on steering lock, so I shaved the brace for clearance with my trusty Dremel tool.

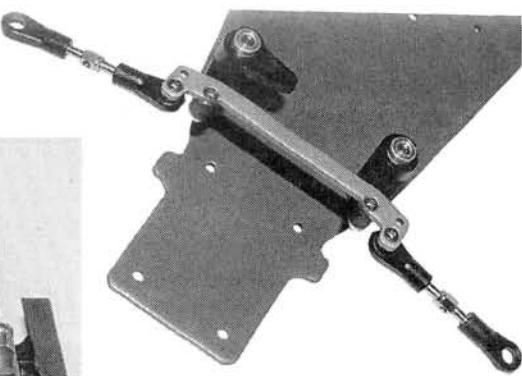
• It took 8mm of shock spacers in front to achieve the correct ride height (the arms parallel with the ground) but none in the rear. If you follow the directions closely, your Mirage will have -2 degrees of front camber, -3 degrees of rear camber and 1mm to 2mm of toe-out at ride height. This is aggressive; first-time 4WD drivers may want 1mm of toe-in for more stability.



**When it's stripped down, you can easily see how beefy the suspension components and the aluminum lower chassis plate are.**

tower offers 10 upper mounting choices, and there are two lower mounting choices on the suspension arms. The rear camber arms have five mounting holes on the diff housing and two on the wheel hubs, so it's highly adjustable for rate of rise. However, the 3.5mm aluminum hinge-pin plate is identical to the one in front, and it isn't adjustable (unlike that of Kyosho Inferno, which comes with three plastic hinge-pin plates, so you can adjust rear anti-squat and toe-in according to your track and style).

Both the rear and front arms have holes that accept setscrews, so you can limit travel without disassembling your shocks and adding spacers. As with the front suspension, an anti-roll (sway) bar is mounted on the diff case and attached to the suspension arm with adjustable linkages. Sliding the linkage arms outward or inward on the bar adjusts the leverage on the suspension and, thus, body roll. Yes, the rear is highly adjustable, but extra hinge-pin plates with various toe-in and anti-squat settings should come with the kit.



**The Mirage Pro is equipped with a steering-bellcrank system that has holes at the end of the slider bar. This allows you to adjust the steering Ackerman.**

### THINGS YOU'LL NEED

Nitro cars such as the Mirage need fuel (20 to 30 percent nitro), a glow starter, starter wheel or box (and 12V power source), paint (Pactra\* lacquer), a battery charger and the basic hand tools for construction, tuning and maintenance. Fuel spills and exhaust residue also make a nitro vehicle dirtier than an electric one, so you need more cleaning supplies (I fit a spray head onto a bottle of rubbing alcohol to clean the engine). Once you have the essentials assembled, you still aren't ready! In my opinion, these are the 10 things all nitro cars must have:

- A 2-channel radio system with good servos (Futaba\* 9301 or better) and receiver batteries (I used Sanyo's\* 5KR600AE 6V hump pack).
- A fuel filter. Clean fuel makes your engine last longer, and debris in your carb can lean its jetting.
- Extra-long fuel line. If your car lands upside-down, the added capacity of a longer fuel line will prevent a flame-out. Loops in the pressure line keep fuel out of the pipe.
- Zip-ties for all lines and filters, especially the air filter. I also zip-tie all wires to keep them out of harm's way.
- A throttle return spring—the most important part you can fit onto your nitro monster (it prevents wide-open runaways). I cut an exhaust-manifold spring in half then formed hooks on each end.
- Fuel-line brake springs. Why hook a high-torque servo to your brakes and then use the weak stock spring? Sections of fuel line offer more braking power and a more progressive feel than springs.
- A 4mm to 5mm section of silicone fuel line to replace the throttle slide saver spring.
- A foam filter. If the kit comes with a paper filter, I make a foam outer wrap for it to extend its life.
- Teflon™ chassis film to slicken and protect the undercarriage and keep dirt out of the screw heads.
- Loctite. Vibration can leave parts all over the track, so assemble with blue (medium) thread-lock.



### Factory Options

At press time, there were no factory options available for the Mirage

Pro. Bill Jeric at Thunder Tiger USA told me that the following parts will be offered for the Pro in the near future:

- A graphite radio tray.
- A graphite servo-saver brace.
- Graphite shock towers.
- A multi-disk fiberglass brake setup.

	Ofna Ultra-GT	Mugen Athlete	Flying Point Jet Probe	Kyosho Turbo Inferno	Kyosho MP-5	Thunder Tiger Mirage
Wheelbase	13 in.	12.7 in.	12.75 in.	12.9 in.	12.625 in.	12.5 in.
Width (F/R)	11.75 in.	12 in.	11.75 in.	11.9 in.	11.875 in.	12.4/12.5 in.
Weight	7 lb., 8 oz.	7 lb., 6 oz.	7 lb., 8.5 oz.	7 lb., 6.4 oz.	7 lb., 2 oz.	7 lb., 12 oz.
Diff type	Planetary	Planetary	Planetary	Mitre	Mitre	Planetary
Brakes	Dual disk	Dual disk	Dual disk	Dual disk	Dual disk	Dual disk
Engine	Not included	Included	Not included	Included	Included	Included
Exhaust	Tuned pipe	Not included	Header and pipe	Not included	Not included	Header and pipe
List price	\$499	\$649.99	\$595	\$679.95	\$699.99	\$499.99
Available at*	\$299	\$439.99	\$369.99	\$499.99	\$549.99	\$349.99
Issue reviewed	11/95	9/94	1/95	9/94	12/95	10/96

\*Prices vary with location.

# Nittech

PRECISION RACING PRODUCTS

Precision Tweak Board for 1/12, 1/10, 1/8 Cars

## FEATURES:

- 3 to 5 grams sensitivity
- Easy to disassemble - one thumbscrew
- Easy storage
- Completely visual - no guesswork



#3002 Only \$59.95

**200** CUTTING EDGE ITEMS FOR THE SERIOUS RACER. HUBS, AXLES, SPECIAL TOOLS, ETC.

SEND \$4.00 FOR COMPLETE CATALOG OR FREE WITH YOUR FIRST ORDER

SEND CHECK OR MONEY ORDER (PLUS \$5.00 SHIPPING & HANDLING) TO:

**NITTECH INC.**

5565 WILSON DR. • MENTOR, OH 44060 • (216)257-6018  
FAX (216)257-4281 • DEALER INQUIRIES WELCOMED

# HOBBYTOW

PAT.PEND.



## 3-Truck Capacity Field Pit Station and Transporter

HobbyTow carries any two 1/10th scale gas or electric racers in its 18" x 13" x 7 1/2" car bays and still has room for another 1/10 scale or 1/8 scale on its front hooks. It also carries all your

tools, parts and accessories and can be equipped with a fuel pump to draw directly from the fuel storage compartment. Rear ball bearing and rubber tread wheels make towing the HobbyTow easy. It also has front swivel wheels for pushing HobbyTow around on hard surfaces. HobbyTow is made with quality 1/2" pre-cut finish-grade plywood. All its joints are mortised 1/2" x 1/4" for extra strength and make assembly fast and easy. Kit includes all hardware and glue. Assembly time 1-2 hours. Completed kit measures 39" x 19" x 19". Axle width 23". Total assembled weight 43lbs.



Send Check or Money Order to:

B.K. Products  
3133 B Albatross Road  
Delray Beach, FL 33444

HobbyTow . . . . . \$124.95

Stackable Drawer Kit . . \$17.95

Shipping . . . . . \$19.95

TOTAL . . . . .

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ St: \_\_\_\_\_ Zip: \_\_\_\_\_

Sorry NO Credit Cards or C.O.D. - (561) 274-9026  
Please allow 2-3 weeks for delivery. Continental U.S. only.

## MIRAGE PRO

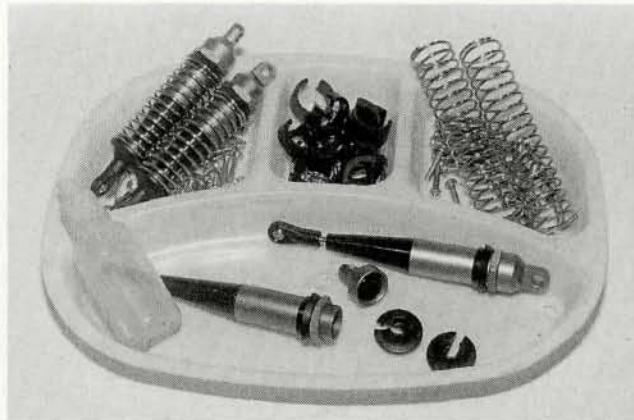
• Powerplant, body and tires. The Mirage buggy kit is available with or without the Thunder Tiger Pro .21B-R(P) engine; the kit tested, no. 6200-A, comes with the Pro engine. This engine is a true ABC powerplant with CNC construction and an anodized, machined, heat-sink head. The 6200-A kit also comes with a Thunder Tiger tuned pipe, spring-held header pipe and formed pipe/header junction. Both kits come with a 90-degree elbow and large paper air filter, along with a 125cc fuel tank. You must supply the fuel line and filter, though.

The Lexan body fits very well and has excellent markings for trimming. Holes in the body's left side (for the fuel filler and engine head) provide cooling airflow for the engine. A plastic wing riser is attached to the rear shock tower and allows you to adjust wing position for downforce. There is also an adjustment on the lower sub-wing for fine-tuning. The Mirage kit offers excellent X-pattern tires and cool-looking wheels with vent holes already drilled, so the tires are compressed on impact, as pneumatic ones are on full-size racecars.

## PERFORMANCE

I ironed out the fuel-tank glitches, but the engine wouldn't start until I turned both carb needles out one full turn. I'm not sure whether the carb came set from the factory this way or whether Doogie was just jerkin' my chain. A couple of fine adjustments later, the Thunder Tiger Pro was rippin'! The .21B-R(P) pulls extremely hard off corners and revs to Pluto. The pipe delivers smooth power—a lot of it. It idles without loading up, too, and this has always been a problem with my 1/8-scale HODR and 1/8-scale Blazer. Power is what it's all about, though, and the Thunder Tiger Pro has more than I can use.

Handling is exceptional. The Mirage takes fast corners as if it's on rails, and it whips around tight hairpins and through "esses" like a snake on a hot griddle. It's a blast to whip the Mirage into a big drift, then power out of it with 4WD, rally style. The Mirage is also very stable, but there's a hint of high-speed wandering on rough straights because of the fairly weak servo-saver spring. I replaced this with a heavy-duty Inferno spring from DuraTrax\*, and the wandering disappeared. I also noticed a little push on dry,



**The shocks have an interesting feature: rubber-sealed boots! These boots help to keep dirt away from the shock shafts, and this lengthens the shock shafts' lives.**

slick surfaces, but a couple of quick adjustments to the swaybars got rid of it. Overall, the Mirage delivers excellent handling right out of the box and can easily be adjusted to conquer any track conditions.

Suspension action is smooth, but the fairly heavy spring rates make the Mirage a real leaper. I alternated between 20WT and 25WT shock oil at either end, depending on the track and temperature (this with one-hole pistons in the front and two-holers in the back). With these settings, the Thunder Tiger flies straight and true, and the suspension arms level at ride height. It doesn't try to nose in or loop out over jumps, and a quick stab at the brakes drops the nose for timing the downslopes of tabletops and doubles. When the tires are on the ground, the brakes work even better—maybe too well. But, hey, as Donald Sutherland said in "Kelly's Heroes," "We like to think that we can get out of trouble quicker than we got into it." The Mirage stops immediately, if not sooner.

## FINAL THOUGHTS

This is an enjoyable car to drive. It works very well as set up according to the instruction manual, and several adjustments make it stick to any surface. It's extremely fast, yet surprisingly easy to drive, doesn't bump-steer and delivers incredible performance at a much lower price than many racing buggies. And though I hate to bag on my other gas buggies, I've got more into them than I do the Mirage Pro, and the Thunder Tiger Mirage is more fun to drive! Dude, do what you gotta do to come up with \$350! If it only had a lawn-mower attachment, you could mow yards by morning and mow the competition by night!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.





ES 10 0 50 5 120 1 150 160

**FOOT-LONG**

**FLy**

#### SPECIFICATIONS

SCALE  $\frac{1}{10}$

LIST PRICE \$180

#### DIMENSIONS

Length overall 15 in.

Width 9.5 in.

Wheelbase 10.5 in.

Track (F/R) 8.25/8.125 in.

WEIGHT (gross, with batteries) 3 lb., 8 oz.

#### CHASSIS

Type Dual-plane  
Material Fiberglass

#### DRIVE TRAIN

Type Open gearbox, belt-driven 4WD

Primary Pinion/spur

Transmission (F/R) Universals, dogbones

Differentials (F/R) Ball diff

Slipper clutch None

Bearings/bushings Bronze bushings

#### SUSPENSION

Front Independent A-arms with upper control link

Rear Independent H-arms with upper control link

Damping Oil-filled, black-anodized aluminum coil-overs

#### WHEELS (F/R)

Type One-piece plastic

Dimensions (DxW) 2.25x1/2.25x1.25 in.

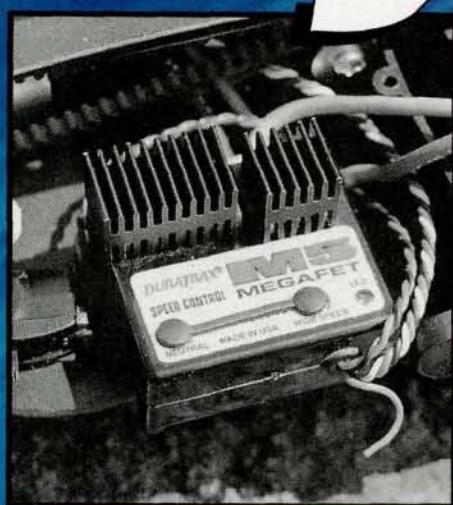
#### TIRES

Front Rectangular cross-hatch pattern, off-road

Rear Rectangular cross-hatch pattern with dashed ribs in the middle, off-road

#### ELECTRICS

Motor, battery, speed control Not included



To route the power from the Orion sport pack to the Trinity motor, I used a DuraTrax M5 MEGAFET ESC.

# YOKOMO Hot Dog 4

by Wendy Matsuda

**W**HEN YOU HEAR the words "electric 4WD buggy," which brands do you think of? Yokomo? Schumacher? Kyosho? Or Tamiya? Now add the word "sport" in front of that term. That would eliminate Yokomo\* from the running. Or does it?

Surprise, surprise! With the invention of its newest buggy—the Hot Dog 4—Yokomo has entered the 4WD buggy sport class. Yeah, "Hot Dog" is a corny name, but believe me, this buggy is no weenie.

## KIT FEATURES

Don't let this kit's sport designation fool you. The Yokomo Hot Dog 4 is packed with features that you don't usually expect on a sport buggy.

For starters, would you expect a sport buggy to have a dual-plane, high-quality, fiberglass chassis? The chassis plates lie parallel to each other and sandwich the front and rear bulkheads as well as the magnesium-alloy motor mount. The dual-plane structure is rigid and strong, yet it's light, it

resists flexing, and it offers more consistent and predictable handling.

Up front, the Hot Dog features a stout plastic bumper that protects the front bulkhead. Attached to the bulkhead is the front tranny cover, or what Yokomo calls the bulkhead cap. Snug inside is the ball diff. I was surprised by this simple but effective design. I'm used to a whole gearbox full of gears, bearings and stuff, but with this Yokomo, there's only one belt-pulley up front. This means there are fewer places from which power can be lost.

The fiberglass shock tower straddles the bulkhead cap and has two holes for shock placement and two additional holes for body mounts (in case you plan to use a truck or car body in place of the buggy body, plastic body mounting posts are included).

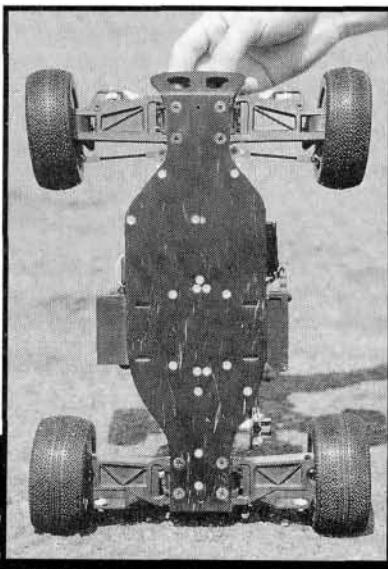
Instead of a drive shaft, the Hot Dog features an efficient belt-drive system. The main drive belt links the front diff to the center shaft's pulley. The belt runs along the length of the top chassis plate, over and under the bell-crank steering system, over the battery-holder box and to the center shaft pulley. The engineers at Yokomo designed this well; to reduce friction, they even installed

small pulleys equipped with bushings near the top of the battery holder. If you're wondering why I haven't mentioned the slipper yet, it's because the Hot Dog kit does not include one; you can buy it separately.

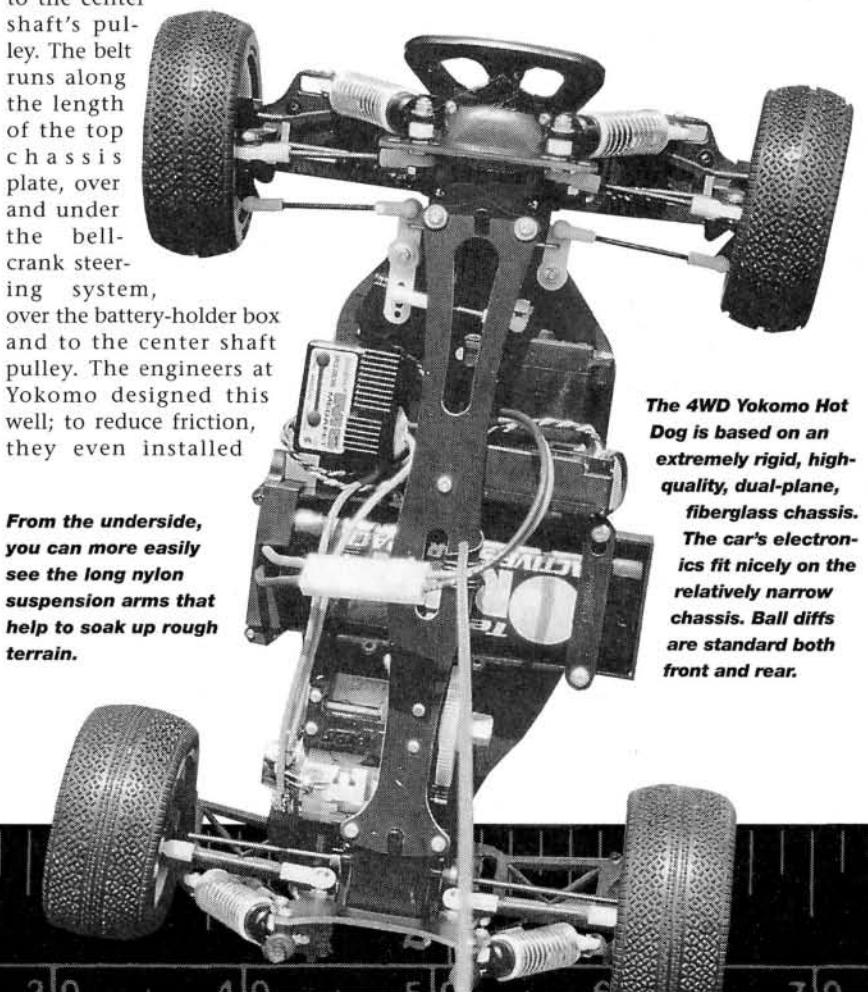
The center shaft transfers power to the rear differential via the rear drive belt. One design flaw is that the rear bulkhead cap does not fully protect the rear diff. I know that there has to be a small opening through which the rear drive belt will enter and exit, but this leaves the diff partially exposed; this might allow a rock to get into the tranny compartment and become embedded in the pulley's teeth, ultimately destroying the pulley and damaging the rear drive belt. Unless you buy the optional protective undertray, drive the Hot Dog on groomed tracks where there are no small rocks. I learned my lesson the hard way. [Editor's note: to allow debris to pass

PHOTOS BY JOHN HOWELL

er



**From the underside, you can more easily see the long nylon suspension arms that help to soak up rough terrain.**



**The 4WD Yokomo Hot Dog is based on an extremely rigid, high-quality, dual-plane, fiberglass chassis. The car's electronics fit nicely on the relatively narrow chassis. Ball diffs are standard both front and rear.**

# Building & Setup Tips

• Look carefully at the illustrations, read the directions and then begin to assemble. Because of the Japanese-to-English translation, the directions might not be clear, but at least the pictures are excellent and should make assembly easy.

• When you assemble the front and rear differentials, be sure to clean your work area; place a paper plate or a white or light-colored towel underneath the parts you are building. If you drop the tiny thrust balls, you'll be able to find them.

• When you assemble the thrust bearings, first slide the spring washer down the capscrew. Dab some black grease on one side of the thrust washer, and slide it down the capscrew shaft so that its greasy side faces upward. Carefully place the eight tiny thrust balls onto the thrust washer. Smear black grease on one side of the other thrust washer, and slide it down the capscrew shaft with the greasy side facing downward so that both washers will sandwich the thrust balls and keep them in place.

• Building the shocks is not difficult, but don't damage the seals. Carefully detach the Teflon™-coated piston from the tree, and trim off any burrs. Secure the piston on the shock shaft with E-clips, and apply some shock oil to the threaded part of the shaft. Then slowly and gently push the shaft's threaded end through the shock body. Be careful not to tear the seals inside.

through the bulkhead without damaging the belt-pulley, cut a small notch in the bottom of the rear bulkhead; see the "2nd Look: Yokomo YR-4" article in the May '96 issue of *Car Action*.]

Other than this, everything was well-designed. I especially like the whale-tail spoiler that is attached to the rear fiberglass shock tower. You won't need to detach it when you remove the body.

The Hot Dog comes equipped with four identical, oil-filled, black-anodized, coil-over shocks. At first glance, you might mistake them for plastic units, as I did. The shocks perform adequately, but they don't offer enough damping with the kit-supplied oil. For better performance, I suggest that you dump the stock oil and get some 40WT or heavier silicone shock oil instead. Only the bronze bushings will tip you off that this is a sport-level vehicle.

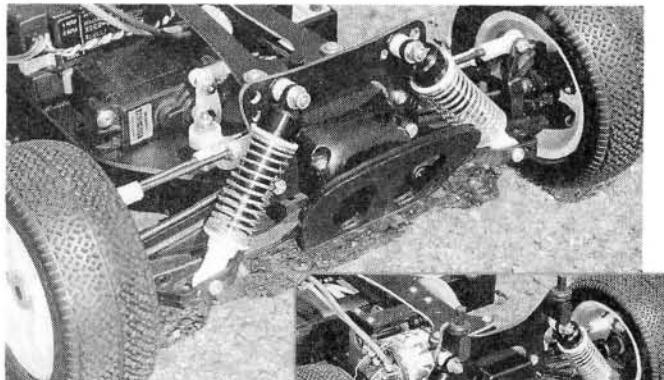
## TEST GEAR

Here's what I used to get my Hot Dog up to speed:

- Jr Propo\* Alpina PCM radio
- One JR Propo NES 507 servo
- Trinity\* 14-turn triple T-Tech modified motor
- DuraTrax\* M-5 ESC
- Orion\* 1400 SCR sport pack

## PERFORMANCE

The Hot Dog's initial trial run took place in Livermore, CA. The outdoor off-road track at Robertson Park (formerly known as Hobby Haven Raceway) is brutally rustic, and it will definitely test any car's



**Above:** in this front view, you can see that this buggy is all business. Long, aluminum, oil-filled shocks provide the damping, and a small plastic bumper absorbs any unfriendly front-end hits. **Right:** the rear shocks are the same as the front ones. The kit-supplied tires hook up well on most track surfaces.



endurance. It had rained about a week before this "Thrash Test," and there were deep bicycle-tire grooves in the now-hardened dirt. Weeds were springing up here and there, and small rocks were scattered about.

I couldn't wait to test the performance of this buggy. Would the Hot Dog 4 live up to its Yokomo name?

With the pack fully charged, I turned on the radio, turned on the car, clicked on the PCM fail-safe switch and pushed full throttle. The Hot Dog sprang to life and kicked up some major dirt as it sped away. I had forgotten that the Hot Dog is not equipped with a slipper. When you push full throttle, it will burn rubber. And don't worry about torque-steer; with excellent stock tires and all four wheels gripping the ground, this was not a problem.

This was my first 4WD buggy, so it took me a little time to get used to driving it. It's amazing how different it feels to drive a 4WD buggy after driving a 2WD one. It's much easier to stop a 4WD, and you can plow through the turns much faster. With the added traction of 4WD, you can boot 2WD buggies off the track and keep runnin' (hee, hee).

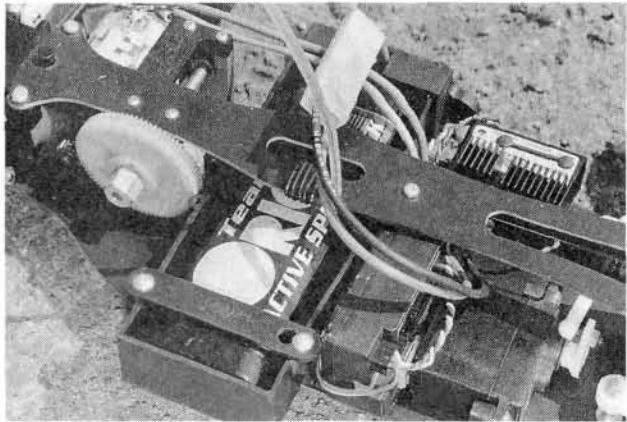
The Hot Dog took the turns with no problems. Its steering was excellent. You still must slow down for sharp turns, but that's reasonable. With its hard springs, the car did not lean much in the corners. The bad part about the stiff springs and light oil is that there isn't much damping. But this isn't a big problem. Next time, I'll just have to use softer springs and thicker shock oil.

The Hot Dog tended to nose-dive on some of the jumps—a small and easily fixed problem. To avoid damaging the gears, I've always been taught to let off the throttle when landing, but with this car, you have to go full throttle, or you'll

## THE COMPETITION

	Kyosho Lazer Alpha	Tamiya Dirt Thrasher	Schumacher Cat 2000 ECS	Yokomo Hot Dog 4
Wheelbase	10.7 in.	10.6 in.	11 in.	10.5 in.
Width	9.4 in.	9.75 in.	9.5 in.	9.5 in.
Weight	3.4 lb.	3 lb., 8 oz.	3 lb., 6 oz.	3 lb., 8 oz.
Diff type	Gear	Gear	Ball	Ball
Chassis	Kelron	Plastic	Fiberglass	Fiberglass
List price	\$169.99	\$198	\$369.50	\$180
Available at*	\$129.99	\$119.99	\$221.70	\$na
Issue reviewed	TC	4/96	TC	10/96

\*Prices may vary with location.



*For juice, I opted to use one of Orion's newest 1400 sport packs.*



## LIKES

- Smooth, quiet belt drive.
- Great stock tires.
- Sleek, distinctive body design.
- Low stance makes it difficult to flip
- Can be upgraded (most parts from the Works 93 and the YZ-10 will fit the Hot Dog).



## DISLIKES

- Parts support needs improvement.
- Shock springs are stiff.
- Chassis is crowded; it's hard to squeeze in all the electrics.
- Rear diff has no protection; rocks and debris may get lodged between the pulley teeth and the drive belt, causing major damage to both.

wind up with your nose in the dirt.

As I was running on my second battery pack, I noticed something funny about the car. It didn't sound any different, but as soon as I let off the throttle, the car skidded to a halt. I picked the car up and pushed full throttle, carefully listening to and disassembled the car. It turned out that a rock was stuck in the rear diff pulley and had done considerable damage to the teeth.

Using a hobby knife to trim off the

chewed-up parts, I managed to do a quick-fix job on the teeth. The pulley isn't good as new, but it runs fairly well. It's always better to replace parts, but sometimes (like when you're on a deadline) you have to improvise.

When I at last got my frequency baton, the answer was clear. The Dog can run. Even on the hard, clay-like surface, the stock tires had great traction. The Hot Dog took the turns in stride, and it made the jumps without bottoming out. (I had switched to Associated 40WT silicone shock oil; this did the trick.) I was having a ball chasing after the other cars and passing them in the turns. They had to slow down while I just plowed through. I love 4WD!

The Hot Dog had a problem with only one jump. The jump was too close to a sharp turn, and when I slowed down to make the turn, the car nose-dived. I later figured out a way to avoid this; simply don't jump; just drive over it.

All in all, I was thrilled by the Hot Dog's performance, and I can't wait to go back to Sacramento for another round with the 2WDs.

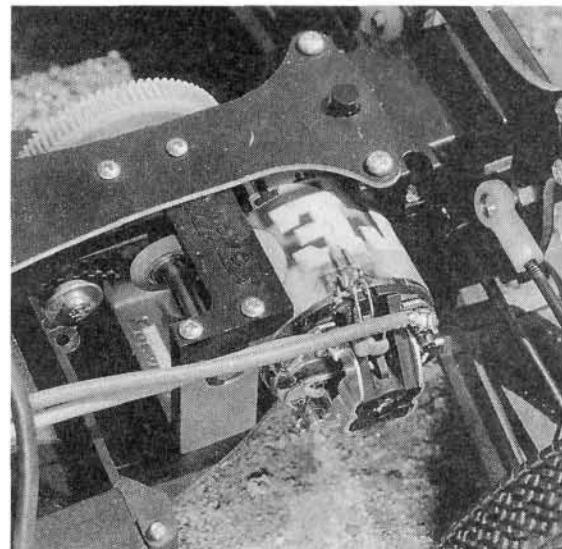
### FINAL THOUGHTS

The Hot dog 4 is a formidable opponent, and it's also a reasonably priced 4WD buggy that's great to start with. When you're ready to upgrade, you can use many parts from its siblings, the YZ-10 and the Works 93.

Not only can it be upgraded, but as the assembly manual states, the Hot Dog is also a "multipurpose car." Just order YR-4 arms, street tires and a touring-car body and voilà! The off-road buggy can be converted into a fast, sleek, pavement pounder.

The Hot Dog's only drawback is that parts can be hard to find. If your hobby shop can't help you, give either Ultimate Hobbies or Horizon Hobby Distributors a

call. They'll be glad to help you out. It is unfortunate that the popularity of Yokomo products hasn't risen to the level of its American counterparts, but with a product like this, you never know...



*A Trinity 14-turn triple T-Tech motor provides the "go" power for the Hot Dog.*

So if you're looking for a good, economical and upgradeable 4WD car, the Hot Dog 4 may be the one for you. Why not check it out and order a Hot Dog to go?

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.

### THINGS YOU'LL NEED

- Radio, servo, receiver.
- No. 1 Phillips micro screwdriver (3mm size).
- Lexan paint.
- Battery.
- Charger.
- Motor.
- ESC.
- Servo-saver support—ZC-210C.
- Steering-hub carrier (5 degrees)—ZC-4130.
- Hard suspension arm-pin set—ZC-408A.
- Center clutch hub—ZC-641.
- Main gear adapter—ZC-641.
- Torque-control system (includes rear drive hub, slipper clutch and related parts)—ZC-670H.
- Hot Dog 4 undertray (protective Lexan cover for the chassis bottom)—HD-BU.
- High-traction wing available in many colors—ZC-108.



### Factory Options

- Sponge bumper (for on-road use)—part no. ZR-001F.

■ Servo-saver support—ZC-210C.

■ Steering-hub carrier (5 degrees)—ZC-4130.

■ Hard suspension arm-pin set—ZC-408A.

■ Center clutch hub—ZC-641.

■ Main gear adapter—ZC-641.

■ Torque-control system (includes rear drive hub, slipper clutch and related parts)—ZC-670H.

■ Hot Dog 4 undertray (protective Lexan cover for the chassis bottom)—HD-BU.

■ High-traction wing available in many colors—ZC-108.



Above: Tamiya's new Kakegawa facility boasts the largest permanent track in Japan. Left: David Dresser of Tamiya's International Division listens as Fumito Taki, general manager of Tamiya's Planning and Development Room (where they make all the cool stuff!), explains the track's features and the infamous "Taki chicane."

# Tamiya Kakegawa Circuit GRAND OPENING

A large, covered pit area provides plenty of space for participants.



PHOTOS BY FRANK MASI

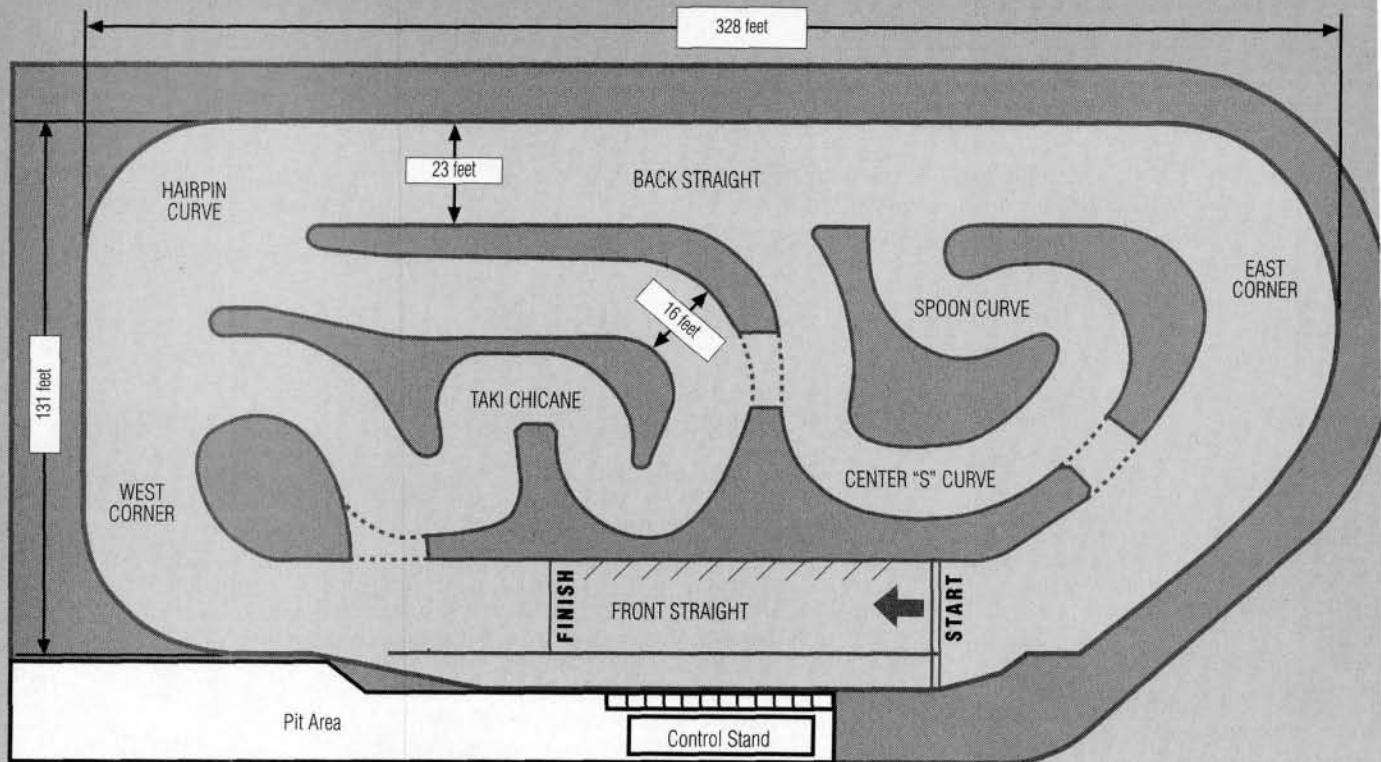
The drivers—Tamiya staff and local talent—are introduced before the start of the exhibition race.



by Frank Masi

**C**OINCIDING WITH the 1996 Shizuoka Toy and Hobby Show in Japan, Tamiya\* invited its international agents and members of the R/C media to attend the grand opening of its brand-new Kakegawa Circuit facility on May 14, 1996. The track, which occupies an area 328 feet (100 meters) by 131 feet (40 meters), is reportedly the largest in Japan, and it's one of the largest permanent tracks in the world.

## TAMIYA KAKEGAWA CIRCUIT



**Left:** drivers in the exhibition race get ready to tear up the track! **Right:** many of the Tamiya TGX Mk.1 gas cars featured hop-ups such as tuned pipes and 2-speed transmissions. The performance of these nitro-burners excited everyone.



The Kakegawa Circuit consists of a large oval course with a challenging roadcourse layout in its infield section. With lane widths varying from 16 feet (500 centimeters) to 23 feet (700 centimeters), the Circuit can accommodate any type of car from  $\frac{1}{10}$ -scale electric to  $\frac{1}{8}$ -scale gas and larger. The sheer size of the facility indicates that Tamiya may be further investigating the possibility of engine-powered vehicles.

Following an exhibition race in which Tamiya design staff and race-team members battled using identical TGX gas cars, Tamiya agents and the press were

**Fumito Taki, general manager of Tamiya's P&D Room, readies his TGX Mk.1 for the start of the exhibition race at the new Kakegawa Circuit.**

invited to participate. I drove one of the new, limited-production, TGX Mk.1 "Kakegawa Circuit Opening Memorial" Calsonic Skyline GT-R kits that's powered by the new OPS VR-15S FV engine with fan-cooling. Additionally, the car was modified with a tuned pipe and Tamiya's 2-speed tranny. Despite the car's impressive speed, the immense Kakegawa track made it seem as though it wasn't traveling as fast as it actually was.

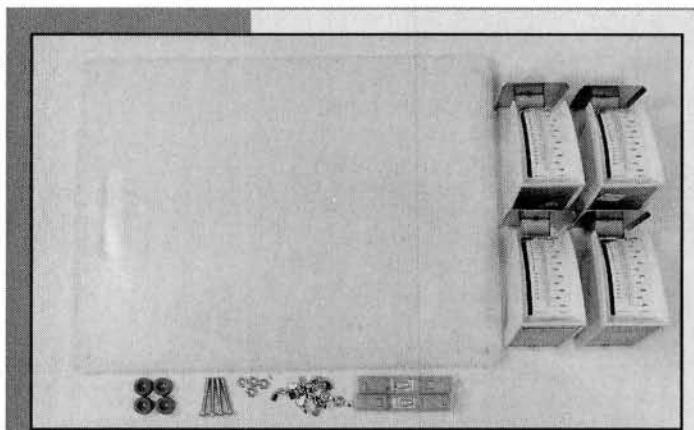
The Kakegawa Circuit is open to the public, and Tamiya plans to stage regular events. Also, the Tamiya World Championship event, previously held at the smaller Tamiya Circuit in Shizuoka, will now take place at the Kakegawa track.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176. ■

by Brian Leslie

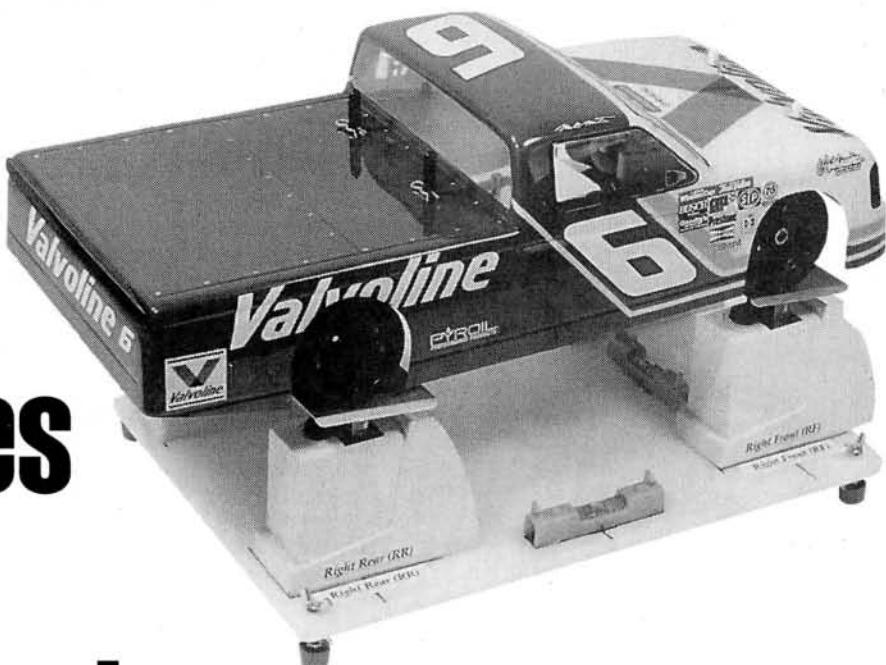
# Use scales to tweak your chassis

HERE ISN'T a Winston Cup NASCAR Race Team that doesn't put its car on the scales before heading out onto the track. Correct distribution of weight on each wheel is absolutely vital to a car's handling, whether it's a 3,400-pound NASCAR or a 2½-pound R/C car. For less than \$30, you, too, can weigh your car like the big boys and fine-tune the suspension systematically instead of guessing at it.



## Things You'll Need

- Four diet kitchen scales (mine are by Sunbeam, part no. 160-1).
- A poly cutting board, 10¾x14½ inches; this is your mounting surface.
- Two carpenter's line-levels (*Popular Mechanics*, no. 34499).
- Four 5/8-inch-diameter rubber feet, (I used ones by Brainerd, no. 438XC).
- Four 8-32x1¾-inch machine screws.
- Eight 8-32 wing nuts.



NASCAR technology scaled down

## Mount the feet

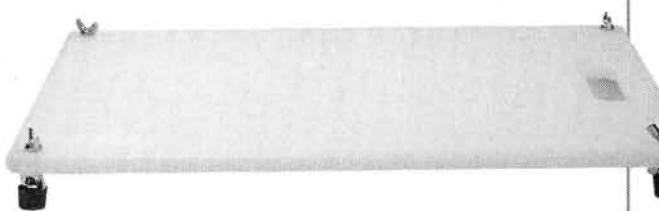
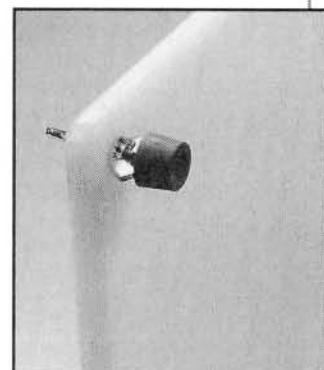
To weigh accurately, your surface must be absolutely flat.

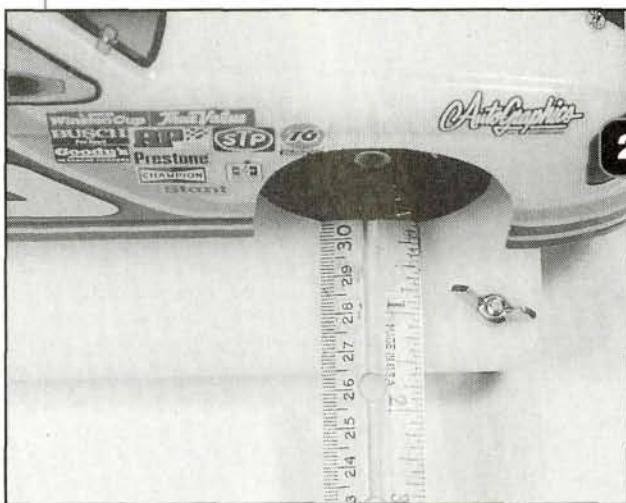
Because you never know where you may need to set up the scales, make the cutting board adjustable by attaching rubber feet. Use a ruler to mark one spot on each corner of the cutting board, ½ inch in from each side.

With a 1½-inch bit, drill holes at the spots you marked.

Place a rubber foot on one 8-32 bolt, and secure it in place with a nut. You may want to use some Loctite\* here to prevent the nut from backing off. Now place a wing nut upside-down on the bolt, and pass the assembly through one of the holes you just drilled; put a wing nut on the bolt, and tighten down.

Repeat this process for the other corners. Try to get all the foot assemblies of equal length. We will adjust them exactly later.



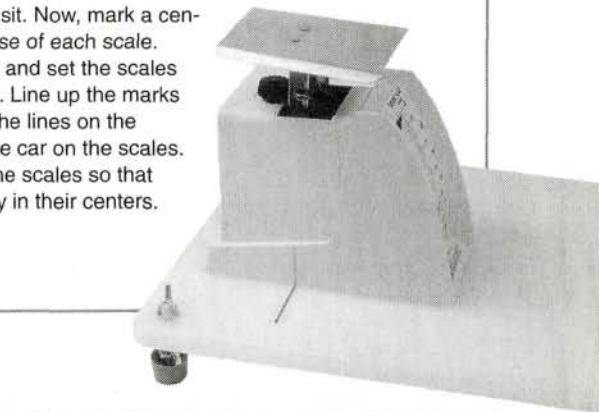


2

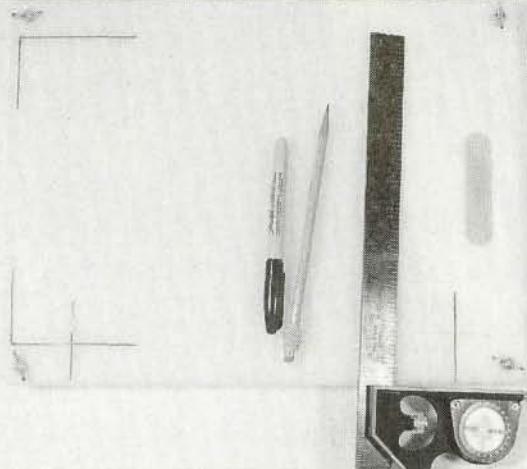
## Position the Scales

To set your car on the board's exact center, measure the distance from each tire to the outside edges of the board. Once the car has been centered, mark the board where the axles sit. Now, mark a centerline on the base of each scale.

Remove the car, and set the scales down on the board. Line up the marks on the board with the lines on the scales. Now, set the car on the scales. Important: adjust the scales so that the tires are exactly in their centers.

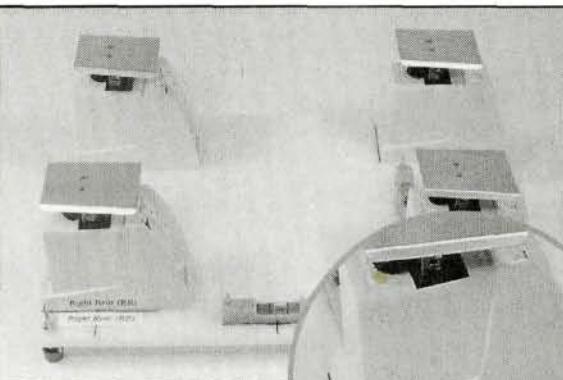


3



## Trace the Outlines

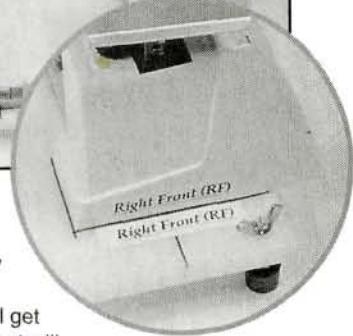
Once all the scales are in place, use a pencil to trace around each base; then, remove them. To ensure that all the scales are square with the edges of the board and with one another, use a square to check the lines you just drew. Use a permanent marker to mark two sides of the scales' base outlines.



4

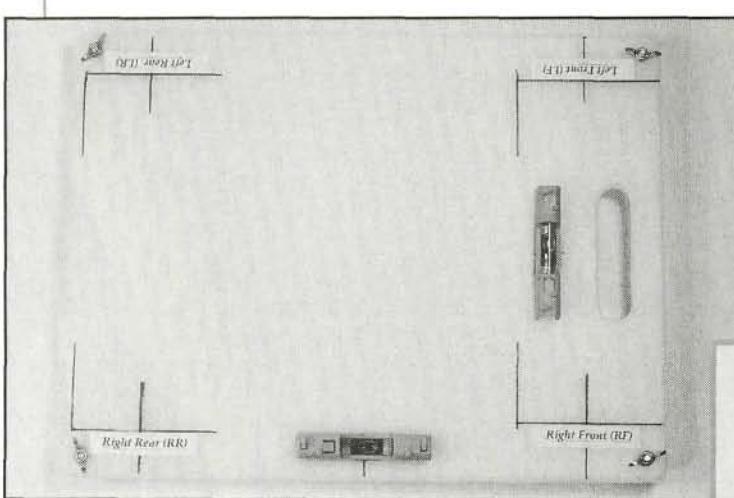
## Labels

Use the same scale in the same place every time you weigh your car; if you don't, you'll get erroneous readings that will have a detrimental effect on your car's setup. Mark each scale, and then mark the spot where it belongs. I made labels for my left-front scale, right-front scale, etc., so that I would always be able to place them correctly.

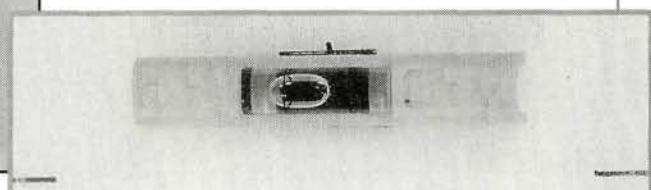


## Mount the Line-Levels

With the board in front of you lengthwise, place a line-level  $1\frac{1}{2}$  inches from the side closest to you and  $7\frac{1}{8}$  inches from the left edge; make sure that the level is parallel to the long edge of the board. Place the second level  $5\frac{3}{8}$  inches away from the side closest to you and  $3\frac{1}{2}$  inches from the right edge of the board, with the line-level parallel with the right edge. Use superglue or double-sided tape to mount the line-levels.



5



## Wheel Weights

The big boys use this simple chart to record wheel weights. For R/C cars, all numbers are in grams. "Left" and "right" are from the driver's viewpoint. The following numbers are from a page in my logbook that I use to record testing:

Left front	260	(A)	Right front	245	(B)
Left rear	460	(C)	Right rear	245	(D)
Total weight	1,210	(E)			

### To convert total weight in grams to ounces

$$1,210 \div 28 = 43.21 \text{ ounces}$$

This is the total weight of my Associated RC10L in race-ready form.

### Here's how to calculate the percentages.

Make sure that everything that goes in the car (battery, electronics, body, etc.) is in before you place it on the scales. Remove all anti-roll bars, if you have them.

#### Front-to-rear percentage.

Divide the total weight of the front wheels by the total weight of the car multiplied by 100. Do the same for the rear.

$$\text{Equation: } A + B \div E \times 100 \text{ front}$$

$$260 + 245 \div 1210 \times 100 = 41.73\%$$

$$\text{Equation: } C + D \div E \times 100 \text{ rear}$$

$$460 + 245 \div 1210 \times 100 = 58.26\%$$

#### Left-side weight percentage.

Add the total weight of the left front to the left rear, and divide by the total weight of the car multiplied by 100.

$$\text{Equation: } A + C \div E \times 100 =$$

$$\text{left-side weight percentage}$$

$$260 + 460 \div 1210 \times 100 = 59.50\%$$

#### Diagonal-weight percentage.

Add the weight of the right front to the left rear, and divide by the total weight of the car multiplied by 100.

$$\text{Equation: } B + D \div E \times 100 =$$

$$\text{right-front to left-rear weight percentage}$$

$$245 + 460 \div 1210 \times 100 = 58.26\%$$

$$\text{Equation: } A + D \div E \times 100 =$$

$$\text{left-front to right-rear weight percentage}$$

$$260 + 245 \div 1210 \times 100 = 41.73\%$$

### Suspension Starting Points

To get your car in the ballpark for most ovals, use the following numbers as starting points for a left-turn-only car:

- Front-to-rear relative weight: a range of 43 to 57 percent.
- Left-side weight: 60 percent.
- Diagonal weight: a range of 53 to 57 percent.

### What to Adjust

**Loose condition (the back end wants to pass the front end coming out of the corners):** tweak the chassis to remove weight from the right rear; this will add weight to the right front and left rear. It doesn't matter which tweak screw you use; if you use the one on the right, you will have to back it off; if you use the one on the left, you will have to screw it down.

**Tight condition (the car doesn't want to turn going into the corners):** tweak the chassis to remove weight from the right front. In other words, do the opposite of what you did for a loose condition.

**Rule of thumb:** the more weight there is on the right front, the more the car will push; the more weight on the right rear, the looser the car will be.

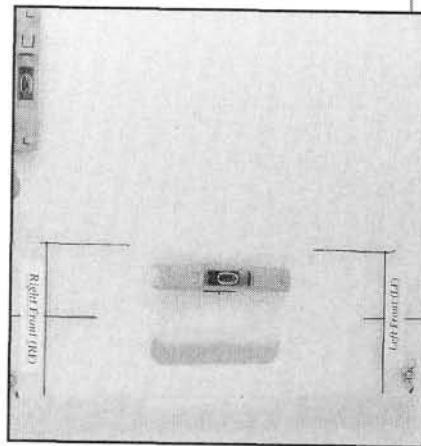
The best thing to do is to place the car on the scales, turn the tweak screws, and see how the scales react. You really need to see this to understand it fully. Take measurements, and do the math to see where your percentages are after each tweak; then run off a battery pack to see how the car handles. Take notes, and make another tweak. In other words, play, play and play.

## Level the Board

The board must be level when you weigh your car. If the board tilts, your scales will give erroneous readings.

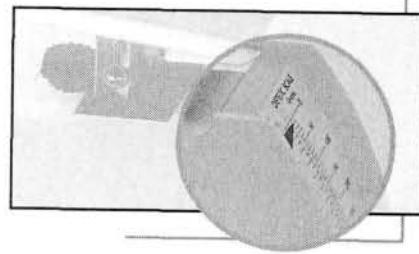
Level the board by checking the bubbles in the line level. Once you have figured out which side of the board needs to be raised or lowered, loosen the wing nuts on the appropriate legs, adjust the legs to the proper height, and tighten the bottom wing nuts.

Check the bubble. If it's centered in the glass, tighten the top wing nut. Do this for each leg that needs to be adjusted until both bubbles read level.



## Zero the Scales

It is very important to "zero out" the scales before you place the car on them. Most scales have a knob just behind the scale table for this purpose.



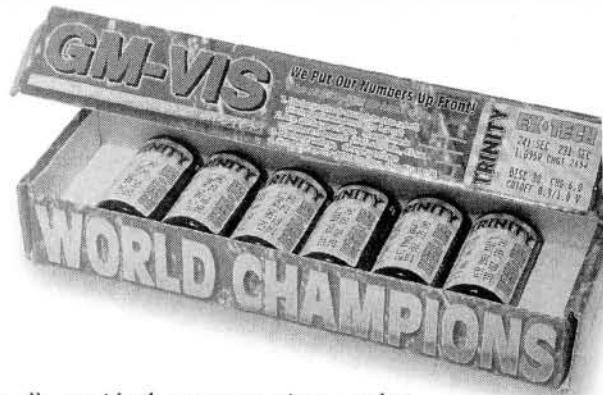
### SUMMARY

Weighing scales are everything to full-size oval-track racers. To adjust a car's suspension, you need to know how much weight sits on each wheel. The racer who knows how to use the scales will be able to correct any handling problem. Take the time to experiment, and learn how to read your scales. It is well worth the effort and, best of all, the knowledge is free.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.



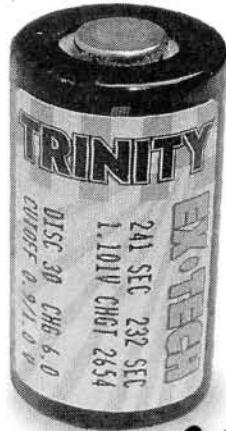
**Whatcha see is  
whatcha get. So that  
you know exactly what  
you're getting, Trinity  
always includes infor-  
mation on the cells on  
the outside of the box.**



**I**F I TOLD you that you could get more power and speed from your batteries without sacrificing run time, would you believe me? Well, at R/C tracks all across the country, there are rumors about a new type of killer cell from Germany that just might alter the future of electric racing. A similar rumor says that Trinity Products\* has been extensively testing new batteries that have a higher voltage than any racing cell currently available. So is there any truth to either story?

Well, actually, they're both true! Thanks to Trinity's new GM-VIS cell-conditioning process, the killer cells are a reality, but they're still so top secret that trying to get more information about them was like trying to get Chris Chianelli to cut his hair.

Here's the scoop on the new cells: Trinity and a German company—GM Racing—have together developed a



## Packin' more punch

new voltage-increasing system (VIS) for Sanyo 1700 SCRC cells and Panasonic Z-1800, 1700-SCR and 1800-SCRZ cells. This new system actually increases each individual cell's voltage by anywhere from 0.03 to 0.05 volt over a 4-minute discharge. Let me tell you, this seemingly small voltage increase makes a big difference to performance.

### MORE PUNCH?

What's the big deal about a bit more voltage? Here are the advantages afforded by the new GM-VIS cells:

- For starters, when a cell has more voltage, it has more punch. When using GM-VIS cells, the first thing you'll notice is that your vehicle is faster, and because the voltage is higher, you might actually have to alter your gearing or switch to a milder motor wind to compensate for the added punch. If you run a lower gear ratio, you'll get the same run time, it will be easier on your motors, and you will go just as fast. According to Trinity, for off-road racers who use these cells, changing their gearing or motor wind is not as crucial as it is to on-landers who use them.
- Stock-class racers will benefit most. The cells' added punch will give them a distinct advantage over those using conventional cells.

As I said, the cells provide the same run time as other cells (sometimes, even slightly longer). Because the voltage is higher, though, the motor draws more current, and the pack may dump sooner than expected even though the run time is the same as that of a typical pack. This is expected to be a concern only in modified

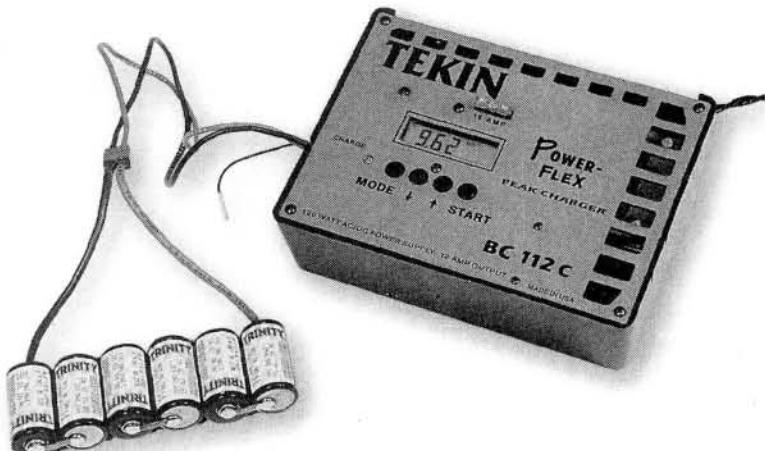
# TRINITY GM-VIS Cells

by John Howell

racing where wild winds have more of a tendency to draw more amps than milder (by comparison) stock motors. To compensate, you would have to experiment, possibly by dropping a tooth on your pinion. You'll still have the same speed (possibly even more) with more punch, but you'll get the same run time. This factor becomes crucial in oval racing.

How much does this extra performance cost? Let's compare: Trinity's new World Tech 1700 SCRCs (6-cells) retail for \$102.75. Similar GM-VIS 1700 SCRCs are listed at \$125. If

my trusty calculator is working properly, that's a \$22.25 price difference, and if you break it down to cost increase per cell, it's roughly \$3.71. (My kindergarten teachers would be so proud of me!) Although they certainly aren't cheap, when they hit the track, racers who



**On my Tekin BC112C AC/DC peak-charger, I tested a 30A 1700 SCRC World Tech pack and a new Trinity GM-VIS pack. At 5-minute intervals, I scrolled through the charger's modes to check each pack's voltage as it was being charged. Check out the chart for the results.**

crave an edge over their competition will find it easy to justify the additional cost of the GM-VIS cells.

For the sake of comparison, I charged two Trinity packs side by side on my Tekin BC112C. The first was a typical 30A World Tech 1700 SCRC pack; the second was of the same type, but it had been conditioned using the GM-VIS process. The results were interesting (see chart).

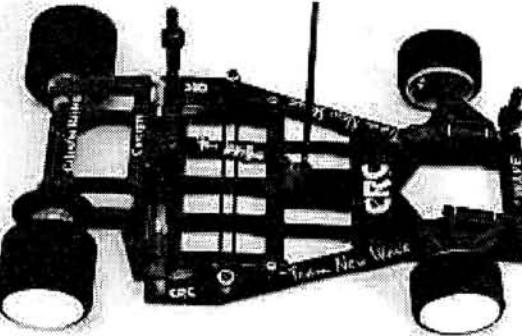
World Tech 30A1700 SCRC		GM-VIS 30A1700 SCRC	
PEAK MODE		1 min. 0.09Ah 8.46 volts 4.96 amps	
1 min.	0.09Ah	1 min.	0.09Ah 8.46 volts 4.98 amps
5 min.	0.41Ah	5 min.	0.42Ah 8.57 volts 5.00 amps
10 min.	0.82Ah	10 min.	0.85Ah 8.71 volts 4.99 amps
15 min.	0.121Ah	15 min.	1.24Ah 8.82 volts 4.99 amps
20 min.	1.65Ah	20 min.	1.70Ah 9.38 volts 4.99 amps
23 min.	1.97Ah (peaked)	23 min.	1.97Ah (peaked) 9.51 volts 5 amps
P2 MODE—RE-PEAK		1 min.	0.14Ah 9.42 volts 5 amps
2 min.	0.18Ah		
	9.33 volts		
	5 amps		

**CELL SHOCK OR CELL SCHLOCK?**  
So should you buy these cells? Well, if you consider yourself a serious racer, I think you should definitely consider it. If you're looking for an advantage over your racing pals, this is one way to get a big jump on them performance-wise (especially if you race in a stock class).

Will the cells make you faster? Most definitely! The new GM-VIS cells are markedly better than cells that have not undergone the VIS process. If you want to stay ahead of the pack, pick up a set. If you don't and your competition does, you might find yourself scrambling to keep up.

\* Addresses are listed alphabetically in the Index of Manufacturers on page 176.

**CALANDRA RACING CONCEPTS**  
Team CRC in Cyberspace - <http://www.teamcrc.com>



## New Stuff!

Sedan Parts from Team CRC!

Call for info on new parts for YR 4 and TA 02 + 03. We have Steering Blocks, Uprights, A-arms, Motor Mounts and many more items in anodized Aluminum!! Available Now!

New!! #4079  
2-Phase Hood Aligner from Team CRC... does both Standup + Laydown... also aligns brushes to comm

Distributed by:  
Horizon Hobby Distributors  
Competition Prod. (MD),  
ERI (NY), Great Planes (IL)



6860 Stanwix Ave  
Rome, NY 13440  
Phone + Fax 315-338-0867

## Team CRC / Speedmerchant Cars

No T-bar!!-Uses spring rear suspension with fluid damping.  
Springs for side stiffness-no shocks for side-to-side.  
Batteries are placed closer to the centerline. - Low Roll Center.  
#1200 Complete Carpet Knife Kit - National Champion!  
#1205 Carpet Knife Conversion Kit - converts Asc 12LW  
#1202 6 cell Carpet Knife Complete Kit-NORRCA Nats #1  
#1206 Carpet Knife 6 cell Conversion Kit-convert Asc 12L  
COMING SOON..... 1/10th Super Speedway Car



Send \$2 for a Catalog. 13927 Progress Parkway • North Royalton, Ohio 44133-4394 U.S.A.

## DILLON 4 REAL CELLS RACING

### 1700 Sanyo SCRC

340+ \$29.00 350+ \$37.50 360+ \$48.00 370+CALL  
+KILLER VOLTAGE - CALL  
WE SELL THEM / NOT SAVE THEM

### NOBULL MOTORS MOTOR PARTS

"24 Deg. LAYDOWN"  
Available in 2 Styles STOCK or CUSTOM  
All Motors Dyno Tested  
CUSTOM-Trued, Dyno Tuned, Race Ready

"WE are KING of the STOCKERS"  
95 US OVAL MASTERS TQ-STOCK Danny King

ROAR Region 3 TQ-Won-Track Record

95 WORLD PAVED OVALS-Track Record & Won KING, NC

### NEW! SUPERIOR SPECTRE CAR \$230

MASTERCARD / VISA / COD Mon-Thur 10AM-7PM Fri 10AM-4PM (EST) 1662 Chinquapin Grove Rd. Bluff City, TN 37618

### BSR Radials

NEW FOAM! \$11.00 pr. UP  
EAST COAST Handwound Modifieds  
NEW Cross-Cut-Slotted T-Plate 10L  
COBRA / HYPERDRIVE / BME  
NEW! TRC Front End / Thunder Wings  
RACEWAY Mfg / VANTAGE Eng.  
PROTOform / BOLINK / HOT BODIES  
TECNACRAFT / RACETECH / LUKE JUICE  
FANTOM PC/Motor Dyno  
COMPETITION ELECTRONICS  
WOLFE MOTORSPORTS  
NEW "BUBBA" Heavy Springs"  
ALL WOLFE Springs on Sale this MONTH

We are the MASTERS of OVAL RACING!

Order 423-538-0655 FAX 538-0075





## HOME BUILT PROJECT

by David Ditner

**T**HIS PAST summer, I had the opportunity to drive the Royal<sup>®</sup> 1/5-scale Hyperspeed motorcycle. What a blast! The bike was completely box-stock, handled well and was really fast. As a motorcycle freak, I had to have one.

The bike comes with a 540 Mabuchi motor that can easily be upgraded to any of the fine, .05-size motors around today. The bikes are available with many of the current superbike motifs, and they look cool right out of the box.

This project, however, was anything but "out of the box." At the Toledo Hobby Expo, I bought the Hyperspeed kit motorcycle. It comes as an assembled, unpainted Yamaha without electronics. It's a little different from the RTR, painted version typically found in hobby shops. Just add a charger and battery to an RTR model, and you are off and running. The package sells for around \$200, and it's quite a deal for someone looking to charge and go. But I intended to modify the bike from the start, so I needed just the basic platform to build on.

### PERFORMANCE MODS

I bought the bike and then needed to choose the electronics and motor. I wanted a faster than stock motor, but I wanted to maintain good control of the bike while I learned to drive it. A competition stock motor would also simplify tuning the bike's suspension. I decided to start with the Trinity<sup>®</sup> Midnight competition stock motor. It's one of the most evil stock motors

# TWO-WHEEL TERROR



PHOTOS BY DAVID DITNER

A Royal Yamaha  
*fresh from the*

# GRAVEYARD



available, and it allows the use of the supplied pinion; this is important because the motor mounts aren't adjustable. I chose the forward-only Novak\* Duster ESC, because it allows me to step into a much nastier motor when my driving skills permit, and it's very economical. I'd like to eventually run a 9- or 10-turn motor in it, but for now, the Midnight is more than fast enough. The remaining radio equipment is a trusty Futaba\* Magnum Junior with the supplied receiver and standard steering servo.

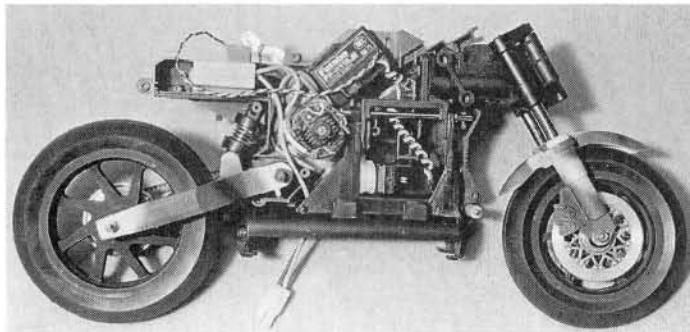
Royal also offers a ball-bearing kit for the bike. Royal gets the kits from Boca Bearing\*, which is known for its high-quality ball bearings. You can order them from your hobby dealer, Boca Bearing, or Royal. Royal will even install them for you. Royal's service manager Dick Kabat told me that there is a 24-hour turnaround time for most service and repairs. The bearing gear kit (part no. 80-469) comes with stainless-steel gear shafts and bearings installed in the gears. The wheel bearings (part no. 80-375) require a little work if they are to fit properly. To get the bearings to fit, you must first remove the chrome plating from the ends of the axles. Dick uses a wire wheel to remove the plating and then finishes them with crocus cloth.

## TWO-WHEEL TERROR

Dick also said that he routinely installs 12-turn motors in bikes with the standard-issue speed control! He told me that the speed control does heat up when you run one of these motors, but if you let it cool after each run, you'll have no problems. As a matter of fact, Dick runs a 7-turn motor in his own bike. The bike is so fast—it has been clocked at 62mph—that he had to make a wheelie bar for it.

### APPEARANCE MODS

• **Rider.** I couldn't allow myself to make this bike look anything but evil. First, the rider had to go (I never put drivers in my R/C vehicles). But a bike would look a little funny without a rider, and I was aiming for evil, not funny. How about a skeleton? A fleshless rider seemed appropriate for this wicked ride.



**Here are this ghastly creation's innards. The Trinity Midnight motor, Novak Duster ESC and Futaba radio gear are well-organized inside this rather cramped chassis. Check out the rear swing arm and mono-shock. Proper damping is very important when you're a skeleton.**

My friend and expert military modeler, Mark Lopiccola, painted the skeleton (a Skillcraft kit available in most hobby stores), and he told me that it was simple. (He just seems to have a knack for that fresh-from-the-grave look.) The Kaiser helmet came from an old Red Baron model kit. It's like a T-bucket hot-rod with the helmet as the roof. When I saw the model, I knew this would be the topper for the skeleton. And what self-respecting, motorcycle-riding skeleton would go without glowing red eyes? Not mine. The Miniatronics\* 1.5V bulbs were hot-glued into the eye sockets. The wires run through the skull and down the vertebrae and look like the spinal cord. The eyes are powered by a 110mAh Ni-Cd battery under the seat, and it uses a glow-

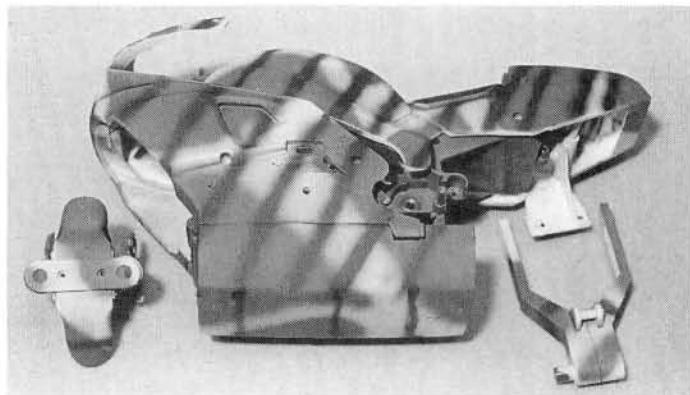
starter charger and adapter.

**A FLESHLESS RIDER SEEMED APPROPRIATE FOR THIS WICKED RIDE.**

• **Paint.** Next, I had to come up with a paint scheme. I had originally planned on gloss black with some wicked decals. I applied the first coat in my workshop using a cardboard box as a makeshift paint booth. My workshop is in the basement of a 70-plus-year-old house, and, needless to say, the paint job was covered with dust and all kinds of airborne nasties. I was incredibly bummed. I decided to sand the paint down and start again. As I sanded, I began to really like the dulled black on the bike. Then I thought—urban camouflage! My urban camo is made of Testor's\* Model Master no. 1933 camouflage gray, no. 1988 Euro gray and no. 1949 flat black.

Mark suggested this color mix, along with the black stripes for uniqueness. He painted camouflage on a tank for me, and I thought I'd give it a try on the bike. It's really quite easy once you've seen it done, but it requires the use of an airbrush for good results. I have occasionally used my Badger\* 200 single-action airbrush for single-color paint jobs, but for this camo job, Mark convinced me to try the Badger 150—a dual-action airbrush. I found this brush quite convenient and easy to use. One button regulates paint flow and airflow, so you have full control of the spray with one finger. With a single-action airbrush, the button regulates only airflow. To adjust the paint flow, you must stop spraying and adjust a separate, not-so-conveniently located knob.

• **Decals.** The bike looked pretty nasty in the camo, but it needed some finishing touches such as decals

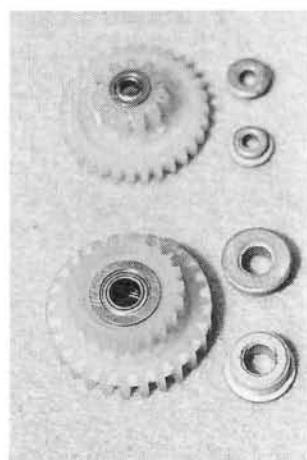


**The author chose a camo paint scheme somewhat accidentally. You have to admit that it suits this wicked ride quite well.**

and lights. I chose water-transfer-type decals intended for use on role-playing miniatures. They require a base of Testor's clear Glosscote to provide a smooth surface. After the decals had dried, I applied five coats of Dullcote to restore the flat finish and protect the paint and decals.

• **Lights.** I wanted to run full lighting on the bike, so I used RAm\* no. 19 headlights and no. 20 tail/brake lights. The kit bike comes with a clear headlight lens that has a reflective gold backplate to make it appear illuminated, but it isn't set up to run lights. I had to use my Dremel\* tool to remove the screw mounts, which are molded into the center of each headlight lens. Then I polished the screw mounts with a buffering wheel and rouge to finish them. I also had to sand the reflective coating on the headlight backplate and drill holes to accommodate RAm's headlight reflectors.

The molded taillights were less complicated; I just drilled holes in them and snapped the lenses in. Caution: the light bulbs are very delicate; I broke one while trying to remove it from the lens. Luckily for me, RAm sells the bulbs separately. I wired the lights through a switch (mounted where the main power switch would have been mounted at the factory) and then to the main battery pack. Though this costs a little run time, it's preferable to mounting a 9V battery in the limited space inside the bike.



**For optimum performance, the author replaced all the bushings with bearings. Hey, where's the diff? Duh, I guess you don't need one when there's only one rear wheel. The smaller gear mates with the motor's pinion, which in turn drives the larger gear. The larger gear mates with the chain, and the chain mates with the rear sprocket. The hip bone's connected to the leg bone, the leg bone's connected to the knee bone....**

# PRO-MATCH COMPETITION BATTERIES

Nobody Does It Better!

## Check Out These Advantages

- Toll Free Ordering!
- Free Shipping!
- Lowest Prices!
- Guaranteed Satisfaction!

## ORDER TOLL FREE TODAY!

**1-800-770-4643**

HOURS: MON-FRI 9-6, SAT 9-12 (MST)  
VISA, MASTERCARD, AMERICAN EXPRESS, COD  
DEALER INQUIRIES INVITED

Support, Service & Fax: 1-520-855-2226

Visit our WEB page: <http://www.promatch.com>

Maxtec Team and Dyno-Select motors now available!

Nobody in the industry knows nicad technology like we do! Our products will make the difference that will put you in the winner's circle!

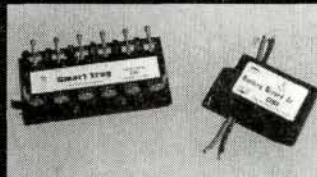
\*Free shipping on orders over \$100

### SANYO 1700 SCRC

340+ \$30  
350+ \$36  
360+ \$42  
365+ \$48  
370+ Call

COMING SOON: 1800 PACKS!

## Ultimate Pack Maintenance!



Smart Tray<sup>(sm)</sup> and Battery Wizard Jr.<sup>(sm)</sup>

Don't take a chance with your nicads! The Battery Wizard Jr. will discharge your packs to the proper level, using any load (such as a string of lights). Just connect your pack and walk away! No fuss, and no more damaged packs!

\$29.95

The Smart Tray will equalize your packs after the primary discharge process. LEDs show cell contact and discharge status. Equalizes packs in only 1 hour! (Not 16 hours like other trays!)

\$24.95

All DEI products carry a LIFETIME warranty!

PRO-MATCH, 2033 S. PALO VERDE BLVD., LAKE HAVASU CITY, AZ 86403

# COBWEBS IN A CAN!

You won't believe your eyes.



New from Coverite's BodyShop, Cobwebs are specially formulated aerosol spray paints that literally splatter right out of the can, allowing you to instantly create wild, California-style paint jobs! Cobwebs can be sprayed on R/C cars, planes, boats and helis, full size autos, trucks, vans and hot rods, even bicycles, helmets, skateboards, sneakers and t-shirts. For unlimited variations and outrageous color schemes on Lexan® car bodies, BodyShop Cobwebs can be sprayed inside the body and backed with any color of BodyShop paints. One can of Cobwebs will last for several R/C car bodies. Richard Muise of Motion Graphics, America's premier R/C car painter says "No secrets or tricks - with BodyShop Cobwebs I can quickly create concours quality custom paint jobs without my airbrush - the possibilities are only limited by the imagination."

## AVAILABLE IN FOUR WILD COLORS!

NEON PINK

PURPLE

NEON GREEN

BLACK

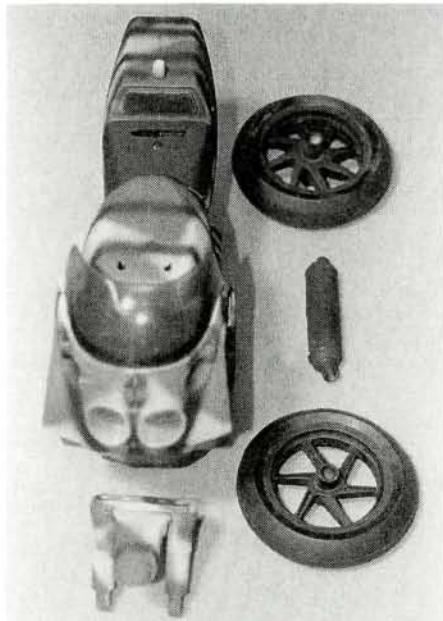
**BODY  
SHOP**

by

**COVERITE**

420 BABYLON ROAD, HORSHAM, PA 19044

## TWO-WHEEL TERROR



**The cowl, front forks, muffler and wheels dry off after being custom-painted. The nightmare is about to begin!**

## TIME TO PLAY

It was time to take this bad boy out for a spin. For its first run, I took it to my favorite parking lot. Man, this thing is an attention-getter! I hadn't even started to run it when I was approached: "Hey, dude, is that thing radio-controlled?"

After some steering-trim adjustments, the bike ran really well. It is definitely faster than stock—I'll guess about 30mph—but it's still easy to drive. It handles just like a full-size bike. At full throttle, it takes a pretty wide turn, and for sharp turns, you must brake first. I couldn't help laughing when onlookers gawked in amazement as my bike leaned hard into a super-tight hairpin.

## FINAL THOUGHTS

I really enjoyed this project. The bike is a must-have for any R/C or motorcycle enthusiast or anyone who's looking for something a little different. It's loads of fun and requires little (if any) maintenance. And you can modify it to your heart's content for performance or appearance. Dick told me that he's working on a .12 gas version. Can you imagine that? If it's going to be anything like the electric bikes, sign me up!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176. ■



# 4<sup>th</sup> Annual Motor Man Challenge

by Dan Haas

**M**ORE THAN 200 racers packed their gear and headed off to Hobby Warehouse of Sacramento (California) for the Fourth Annual Motor Man Challenge. Sunny skies, perfect temperatures and fast-paced off-road racing action ensured a great weekend for participants and spectators. There were five classes—2WD Stock and Modified, 4WD Modified and Stock and Modified Truck—four rounds of qualifying and Triple A-Mains to determine the winners.

*Sponsored by  
Hobby Warehouse*

**200 off-Road racers do battle in Sacramento**



**The Francis brothers, Mark (left) and Matt, work on their cars during one of the breaks. This time, Mark got the glory by winning 2WD Modified.**

## QUALIFYING

- **2WD Stock.** Shawn Dassonville's consistent driving style won him the TQ honors.
- **2WD Modified and Truck Modified.** Trinity/Team Losi driver Brian Kinwald aced the competition in both classes.
- **4WD Modified.** Alex Guerrero had his Yokomo YZ-10 dialed and took the TQ position.
- **Stock Truck.** Chris Schoppe came out on top.

## A-MAIN ACTION

- **2WD Stock.** In the first of three A-Mains, TQ Shawn Dassonville had a clean start, and Lloyd Dassonville and Rick Vehlow followed. This was an exceptionally clean race; the top three held their positions to the end.

The A-2 Main was a little more heated. Shawn got out in front, John Scott claimed second and Dassonville took third. Scott tagged a washboard, and that put him in fourth, and Vehlow snuck up to take third. Shawn kept ahead of the pack and finished nearly 3 seconds ahead of

Lloyd  
Dassonville and  
Vehlow.

Around the first turn of the A-3 Main, Scott was out in front as Vehlow and Shawn Dassonville followed closely behind. At the 3-minute mark, Shawn passed Vehlow as Scott widened the gap between his car and the rest of the pack. Scott was the only one to finish 14 laps with a time of 4:17.90. Shawn finished second, and Vehlow third. When the points were tallied, Shawn Dassonville was in first (200 points), Lloyd Dassonville had grabbed second (198 points), and John Scott was third (197 points).

• **2WD Modified.** In the A-1 Main, TQ Brian Kinwald got the jump start and ended up in front; Team Associated's Mark Francis was in second position, and Trinity/Team Losi driver Greg Hodapp nabbed the show position. At about 1½ minutes, Hodapp got hung up and dropped to sixth, and that gave Jimmy Jacobson a clear third place. Francis maintained second to the end, and Hodapp worked his way up to fourth. In the end, Kinwald crossed the line first with 14/4:09.45, Francis rolled in second with 14/4:13.72, and Jacobson

fourth. From the beginning, Kinwald seemed to be having trouble with his buggy, and before too long, he was out of the race. Mark Francis finished first with 14/4:13.56. Jacobson posted 14/4:16.92 for second, and Matt Francis finished third with 13/4:00.80.

In the A-3 Main, Mark Francis again took the lead with Kinwald hot on his trail. Matt Francis was close behind with Hodapp in fourth. As Kinwald tried unsuccessfully to pass him, Mark was determined to keep the lead, and he finished first, less than ½ second ahead of Kinwald. Hodapp finished third, and Matt Francis fourth. When the points were totaled, Mark Francis came out on top (200 points), Brian Kinwald took second (198 points), and Jimmy Jacobson earned third place (197 points).

• **4WD Modified.** TQ Alex Guerrero was the man to watch in this class. In the A-1 Main, Guerrero was out in front from the beginning, and he was followed by Tony Vega, James Arluck and Shawn Nibbelink. Nibbelink worked his way to second and put Arluck in third. At the 2-minute mark, Arluck rolled his car, so Vega took his place. Guerrero finished first and was the only driver to crank out 14 laps, while Nibbelink finished second, and Tony Vega rounded up third.

In the A-2 Main, Guerrero maintained the lead for most of the race, while Nibbelink and Arluck battled it out for second. With 30 seconds to go, Guerrero rolled his car and dropped to third. Nibbelink finished first, Arluck second and Guerrero third.

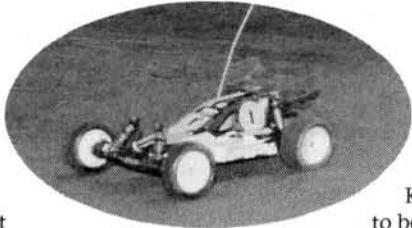
Guerrero made up for his A-2 Main mistake: when the buzzer sounded in the A-3, he blasted off the line and left his competition in the dust. Nibbelink was in second, but he lost control in the doubles, leaving second open for Arluck. Guerrero finished with 13/4:00.99; Arluck came in second with 13/4:10.43; and Nibbelink came in third with 13/4:16.30. The final results were Guerrero on top (200 points), Nibbelink second (199 points) and Arluck third (198 points).



The Trinity "Gold Dust Twins," Brian Kinwald (right) and Greg Hodapp, prepare for the start of the triple A-Mains. Brian Kinwald was the overall winner of Modified Truck.

rounded off the top three with 13/4:00.51.

In the A-2 Main, Mark Francis shot to the lead, with Team Associated driver and 2WD world champion Matt Francis and Jimmy Jacobson following dangerously behind. Matt Francis and Brian Kinwald collided on the doubles, causing Francis to fall back to



Hobby Warehouse owner, Roger Hubbard, takes a moment to talk to 2WD IFMAR World Champion, Matt Francis. Hobby Warehouse happens to be Matt's home track, so you can bet that the local racers are pretty good drivers.

• **Truck Stock.** In the A-1 Main, TQ Chris Schoppe had a clean start and kept the lead for most of the race. With 15 seconds to go and David Goss at his back door, Schoppe wiped out, so Goss took the lead and the win with 13/4:16.33. Schoppe finished with 13/4:18.98 to take second, and Cameron Eccel finished third.

**The Motor Man Challenge has become recognized as an important non-sanctioned racing event.**

In the A-2 Main, Schoppe dropped to third, with Eddie Bernal and David Goss in the number-one and -two spots, respectively. At about the halfway point, a pile-up in the doubles sent Schoppe back to seventh. Goss finished the race first, less than 1 second ahead of Bernal. John Neary entered the limelight by finishing third.



Talk about mixing it up. This turn marshal learns how to do the two-step shuffle in an awful hurry!

# Winners

## 2WD Stock

Fin	Name	Chassis	Motor	Battery	ESC	Radio	Body	Tires (F/R)	Pinion/spur
1	Shawn Dassonville	Assoc.	Motor Man	Reedy	Novak	Airtronics	Assoc.	Losi/Pro-Line	22/81
2	Lloyd Dassonville	Assoc.	Motor Man	Reedy	Novak	Airtronics	Assoc.	Pro-Line/Pro-Line	22/84
3	John Scott	Assoc.	Peak Perf.	Orion	Tekin	Airtronics	Assoc.	Losi/Pro-Line	23/81
4	Rick Vehlow	Losi	Peak Perf.	Orion	Novak	Airtronics	Jammin	Losi/Pro-Line	24/88
5	Wes Casper	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Pro-Line	19/84
6	David Goss	Assoc.	Gary Bennett	Double Strike	LRP	Airtronics	Assoc.	Losi/Pro-Line	23/83
7	Jason McGlade	Assoc.	Motor Man	Motor Man	Tekin	Airtronics	Assoc.	Losi/Pro-Line	23/81
8	Ethan Erchinger	-	-	-	-	-	-	-	-
9	Rob Moots	Losi	Motor Man	Motor Man	Novak	Airtronics	Jammin	Losi/Pro-Line	21/84
10	Shawn Nibblelink	Assoc.	n/a	Reedy	Tekin	Airtronics	Assoc.	Pro-Line/Pro-Line	n/a

## 2WD Modified

1	Mark Francis	Assoc.	Reedy	Reedy/Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	-
2	Brian Kinwald	Losi	Trinity	Trinity	LRP	Airtronics	Losi	Losi/Losi	18/84
3	Jimmy Jacobson	Assoc.	Reedy	Reedy/Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	-
4	Matt Francis	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Losi	-
5	Greg Hodapp	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Pro-Line	-
6	J.D. Beckwith	Assoc.	Reedy	Reedy/Orion	Novak	Airtronics	Assoc.	Pro-Line/Losi	-
7	Wes Casper	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Pro-Line	-
8	Rick Hohwart	Assoc.	Peak Perf.	Orion	Novak	Futaba	Assoc.	Losi/Pro-Line	-
9	Lloyd Dassonville	Assoc.	Reedy	Reedy	Novak	Airtronics	Assoc.	Pro-Line	18/84
10	Ethan Erchinger	-	-	-	-	-	-	-	-

## Truck Stock

1	David Goss	Assoc.	Gary Bennett	Double Strike	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	20/87
2	Eddie Bernal	Assoc.	Reedy/Motor Man	Reedy	Tekin	Airtronics	Protoform	Pro-Line/Pro-Line	20/87
3	Chris Schoppe	Assoc.	Peak Perf.	Pro-Match	Tekin	Airtronics	Assoc.	Pro-Line/Pro-Line	20/87
4	Bob Russell	Assoc.	Hobby Warehouse	Double Strike	Tekin	Airtronics	Dahm's	Pro-Line/Pro-Line	20/87
5	Cameron Eccel	Losi	Motor Man	Pro-Match	Novak	Airtronics	Losi	Losi/Losi	19/88
6	John Neary	Assoc.	Mo Motors	Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	20/87
7	Tony Vega	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	21/88
8	Dominic Favorito	Losi	Maxtec	Perf. Match	Tekin	Airtronics	Losi	Losi/Pro-Line	24/86
9	Jeff Maurer	Losi	Twister	Orion	Tekin	JR	Losi	Losi/Pro-Line	19/88
10	Michael Wood	-	-	-	-	-	-	-	-

## Truck Modified

1	Brian Kinwald	Losi	Trinity	Trinity	LRP	Airtronics	Losi	Losi/Losi	18/88
2	Rick Hohwart	Assoc.	Peak Perf.	Orion	Novak	Futaba	Assoc.	Pro-Line/Pro-Line	18/87
3	Mark Francis	Assoc.	Reedy	Reedy/Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	18/87
4	J.D. Beckwith	Assoc.	Reedy	Reedy/Orion	Novak	Airtronics	Assoc.	Pro-Line/Pro-Line	20/87
5	Richard Saxton	Assoc.	Reedy	Reedy	Novak	Airtronics	Assoc.	Pro-Line/Pro-Line	18/87
6	Alex Guerrero	Losi	Peak Perf.	Orion	Novak	Sanwa	Losi	Pro-Line/Pro-Line	18/88
7	Jimmy Jacobson	Assoc.	Reedy	Reedy/Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	18/81
8	Greg Dennett	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	18/87
9	Greg Hodapp	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	18/88
10	Matt Francis	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	18/87

## 4WD Modified

1	Alex Guerrero	Yokomo	Peak Perf.	Orion	Novak	Sanwa	Yokomo	Pro-Line/Pro-Line	17/84
2	Shawn Nibblelink	Yokomo	Reedy	Reedy	Tekin	Airtronics	Yokomo	Pro-Line/Pro-Line	n/a
3	James Arluck	Yokomo	Reedy	Double Strike	Novak	Airtronics	Yokomo	Pro-Line/Pro-Line	17/87
4	Tony Vega	Yokomo	Trinity	Trinity	Tekin	Airtronics	Yokomo	Losi/Losi	21/87
5	Wade Eldredge	Schumacher	Reedy	Trinity	Novak	Airtronics	Schumacher	Pro-Line/Losi	19/92
6	Eric Zimmerman	Schumacher	Motor Man	Motor Man	Novak	Airtronics	Schumacher	Pro-Line/Pro-Line	16/90
7	Skip Hart	Yokomo	Reedy	Motor Man	LRP	Futaba	Yokomo	Pro-Line/Pro-Line	17/87

In the third A-Main, Schoppe had the lead until trouble in the doubles dropped him back two places. Goss and Bernal were battling for first again. Goss finished first again—victory in all three A-Mains—with a perfect 200 points for the overall win. Bernal finished second (198 points), and Schoppe followed (196 points).

• **Truck Modified.** In the first Truck Modified A-Main, Top Qualifier Brian Kinwald started off with the lead and left the competition in his wake. Kinwald never looked back and easily took the win. The battle for second was now between Mark Francis and Peak Performance owner and driver Rick Hohwart. During the last minute, Francis and Hohwart tangled at the table-top jump, and that put Francis in sec-

ond, but he soon lost his position to Hohwart, who just wouldn't settle for third.

In the A-2 Main, the lineup was Kinwald, Hohwart, Alex Guerrero and Mark Francis. With about 3 minutes down, Francis tried to pass Guerrero, tangled with him and ended up on his lid. This set them both back to fifth and sixth, and Richard Saxton inherited third. Meanwhile, Hohwart continued to put the pressure on Kinwald, who never broke a sweat and finished first with Hohwart less than 1 second behind. Saxton held on to third.

He had already secured the overall win, so Kinwald sat out the A-3 Main and let the rest of the field fight it out for second. Mark Francis gained a huge lead and held it to the end, while J.D. Beckwith and Jimmy Jacobson fought for second. At the buzzer,

Rick Hohwart managed to pass Jacobson and finish third. Beckwith ended up in second, while Francis took the win. With the points totaled, Kinwald was on top (a perfect 200 points), Hohwart in second (198 points) and Mark Francis in third (198 points).

The folks at Hobby Warehouse did a fine job putting together this year's Motor Man Challenge. It was a great success! The qualifying rounds were completed on schedule, and the Mains ran without a glitch. Congratulations to all the racers for their awesome performances, and thanks to Hobby Warehouse for an incredible weekend of racing.

Addresses of the companies mentioned here are listed alphabetically in the Index of Manufacturers on page 176.





# IFMAR

## On-Road World Champion

**H**eld at Revelation Raceway in Ontario, CA, the Electric Spring Challenge was the IFMAR World Championships warm-up race. Maxtec\* and Yokomo\* sponsored the event, and many other manufacturers showed up. There were 10 classes: F1 Stock; Sedan Novice, Stock, Expert Stock and Modified; GTP Novice, Expert Stock and Modified;  $\frac{1}{12}$  Modified; and Gas

Sedan. Three rounds of qualifying were scheduled for Saturday and one for Sunday. Triple A-Mains were also on Sunday.

### QUALIFYING

In F1 Stock, Boyd Gaebel was the top qualifier. After four grueling rounds, a lead of less than 1 second gave Mark Peacock the TQ position in Sedan Novice.

Sedan Stock TQ Brian Fong was the only driver to pull 11 laps. Ken Gerberding led the way in Sedan Expert Stock with 11/4:09.36. In Sedan Modified, Masami Hirosaka had his Yokomo YR-4M dialed as he took the TQ honors. Eduardo Cademartori finished on top in GTP Novice with 11/4:03.42. Brian Rutherford aced the competition in GTP Expert Stock. Mark Pavidis cruised to the TQ spot



The Sedan Modified winners (left to right): Yukio Wakasugi with his Yokomo YR-4M (second); Masami Hirosaka with his Yokomo YR-4M SP (first); Murai Masayuki with his HPI RS4 (third); and Hidekazu Ito with his HPI RS4 (fourth).



The GTP Modified winners (left to right): Mike Swauger with his Associated RC10L (second); Joel Johnson with his Trinity\* EV10 (first); Masami Hirosaka with his Yokomo YRX-10 (third); and Mark Pavidis with his Associated RC10LS (fourth).



The  $\frac{1}{12}$ -scale Modified winners (left to right): Joel Johnson with his Trinity Magic Carpet Ride (second); Masami Hirosaka with his Associated RC12LS (first); Josh Cyril with his Associated RC12LS (third); and Jon Orr with his Associated RC12LS (fourth).



The GTP Expert Stock winners (left to right): Jimmy Wright with his Yokomo YRX-10 (second); Brian Rutherford with his HPI Road Star (first); Paul Trux with his Yokomo YRX-10 (third); and Greg Larson with his Yokomo YRX-10 (fourth).

\*OS BY DAN HAS

in GTP Modified by posting a 15/4:14.66 best time. In 1/12-scale Modified, Masami Hirosaka won the TQ position by a narrow margin with 28/8:07.17. Wen-Ping Chiang blew away the competition in Gas Sedan as the only driver to post 13 laps.

#### A-MAIN ACTION

• **F1 Stock.** Three drivers competed in the F1 Stock class. Boyd Gaebel proved to be the fastest and most consistent. In the A-1 Main, Frank Malone had some trouble with his car and pulled it off the track during the last 30 seconds. Dominic Alessi rolled his car in the A-2 Main but managed to finish second. Only two A-Mains were run for this class because Boyd Gaebel came out on top in both. Dominic Alessi finished second, and Frank Malone was third.

• **Sedan Novice.** Top qualifier Mark Peacock was plagued by problems. He had some trouble in the first A-Main and finished fourth. Chris Fisher, Paul Stump and Kathy Welsh filled the top three positions.

In the second A-Main, Peacock started in front and gained a huge lead over the rest of the field. With 1½ minutes to go, his car started to glitch and ended up in the wall. That was it for him. Stump finished first, Fisher second and Welsh third.

In the A-3 Main, Peacock collided with Fisher, and that caused him to drop back.

**Below: here's a look at Team Trinity driver Joel Johnson's A-Main-winning EV10. This car was dialed!**

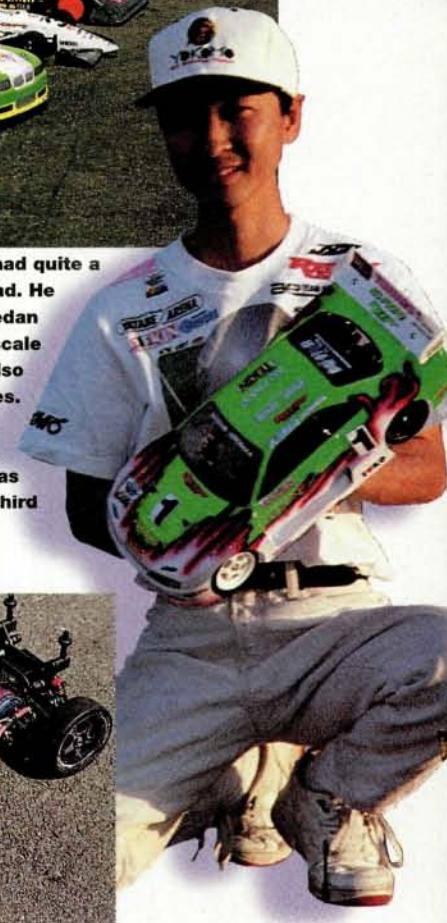


**Masami Hirosaka** had quite a successful weekend. He not only TQ'd in Sedan Modified and 1/12-scale Modified, but he also won in both classes. Masami made a strong showing in GTP Modified as well by placing third overall.



**Masami's prototype YR-4M SP was the car to beat in Sedan Modified. Note the prototype narrow slicks on all corners.**

**These tires will be available by the time you read this.**



# ship Warm-Up Race

by Dan Haas

That left Stump, Fisher and Welsh out in front. Fisher made a move on Stump, and they collided. This pushed Stump back to second. Fisher ran away with the lead and finished first, with Stump second and Peacock third. With the points totaled, Chris Fisher came out on top while Paul Stump and Kathy Welsh filled the number-two and -three positions.

• **Sedan Stock.** In the A-1 Main, Brian Fong led the way, with Hendra and Jim Welsh following closely. Welsh clipped some dots, and that allowed Peter Cruz to pass and take over third place. Fong extended his lead and finished the race a lap ahead of Hendra and Cruz.

In the A-2 Main, Hendra made the inside pass on Fong after the start, with Cruz in third. Welsh managed to get past Cruz to take third. Welsh's Yokomo sedan seemed to vibrate a lot, but he kept it together. Hendra and Fong battled it out for the entire race, but Hendra kept the door slammed on Fong and finished about 1 second ahead of him. Welsh came in third.

The A-3 main was the deciding race in this class. Hendra and Fong came out battling for the lead again, but Hendra managed to keep it for the entire race and finished with 14/5:17.09. Fong placed second with 14/5:19.80, and Welsh was third with 13/5:07.36. Hendra led with 200 points, followed by Brian Fong with 199 and Jim Welsh with 196.

• **Sedan Expert Stock.** Raymond Patra



## IFMAR WORLDS WARM-UP

made a nice move on top qualifier Ken Gerberding to take the lead. Gerberding dropped to third, and that moved Wally Goenner to second. Goenner was all over Patra, but Patra held him off. At the halfway point, Gerberding managed to work his way back up to second and was knocking on Patra's back door. He squeezed past Patra and bolted into the lead. Patra and Goenner collided, while Paul Freyre found an opening and took second. Patra passed Freyre for second place. Gerberding finished way ahead while Freyre finished third. The second A-Main was less eventful as Gerberding maintained the lead throughout the race and finished first. Patra came in second, and Freyre was third.

The third A-Main was a total cluster, and with so many position changes, it's nearly impossible to give you a play-by-play. When the smoke cleared and the points were tallied, it was Gerberding on top with 200 points, Patra second with 199 and Freyre third with 198.

• **Sedan Modified.** In the A-1 Main, TQ Masami Hirosaka broke away from the pack and left the other cars in the dust. Murai Masayuki, Yukio Wakasugi and Ken Gerberding filled the second, third and fourth positions. Hidekazu Ito later worked his way up to fourth. In the last



**Orion's Philippe Neidhart (right) takes a break to have a soda and talk to the legendary Ron Paris.**

minute of the race, Masayuki had a problem with his car and didn't finish. Hirosaka won and was the only driver to break the 13-lap barrier. Wakasugi finished second, and Ito was third.

In the A-2 Main, a crash after the first lap claimed Ito's car. Hirosaka was again way out in front with Masayuki and Wakasugi following not so closely behind. Hirosaka ran another 13-lap race and finished first, with Masayuki in second and Wakasugi in third.

In the A-3 Main, Hirosaka once again charged out in front with his new Yokomo YR-4M SP. Wakasugi and Ito battled for second. Masayuki, in fourth, managed to get past Ito. Hirosaka finished first for his third straight win. Wakasugi came in second and garnered second place

overall with 198 points, and Masayuki finished third with 196.

• **GTP Novice.** In this class, there were three drivers. Top qualifier Eduardo Cademartori had his Associated\* RC10LS dialed and won the two A-Mains without a glitch. Rene Racine came in second overall with two second-place wins, and Bryan Gaebel finished third.

• **GTP Expert Stock.** TQ Brian Rutherford had his HPI\* Road Star dialed and finished the A-1 Main without a problem. Jimmy Wright finished second, and Greg Larson was third.

In the second A-Main, Rutherford had the early lead while Paul Truex and Wright battled for second. Larson dropped out after five laps. Truex held Wright off to the end and finished less than  $\frac{1}{2}$  second ahead of him.

Because he had two straight first-place finishes and the overall win, Rutherford stayed out of the A-3 Main to let the rest of the pack battle for second. Wright, Truex and Larson fought for the lead. Wright managed to build a comfortable lead while Larson put the pressure on Truex. At the very last second, Larson squeezed past Truex for second place, only 0.03 second ahead of him. Talk about close racing! Rutherford finished

# ON THE INFORMATION SUPERHIGHWAY

## Cursor to the button, Pedal to the metal

On the information superhighway  
there are no speed limits. When you  
log onto the Serpent TSN Internet web site,  
you move into the fast lane of cyber R/C:  
Detailed information on car dynamics and  
tuning, timely race reports, even a racer forum  
for you to discuss R/C subjects on a global scale.  
The only real limits are how fast you want to go,  
and how much fun you want to have.

If you're into R/C, check out  
the Serpent TSN internet site.  
Because the track isn't the only place  
where Serpent is speeding.



**<http://www.serpent.com>**

with 200 points for the overall win, Wright ended up second with 199, and Truex finished third with 197.

• **GTP Modified.** Team Trinity driver Joel Johnson finished the A-1 Main without a glitch and aced Mike Swauger, who finished second, and top qualifier and Team Associated driver Mark Pavidis, who finished third.

In the A-2 Main, Mark Pavidis, Mike Swauger, Masami Hirosaka, Joel Johnson and Brian Kinwald freight-trained through the S-turns. Hirosaka managed to get past Swauger and Johnson, who stayed on Hirosaka's tail. Kinwald followed right behind Johnson until Johnson tangled and fell back. Then it was Pavidis, Hirosaka, Kinwald, Johnson and Swauger in that order. During the last 3 seconds, Pavidis' battery dumped—oh no! Johnson passed Hirosaka for a clear path to the finish line and first place. Hirosaka sailed in to take second, Swauger clinched third, Pavidis rolled in for fourth, and Kinwald strolled in to take fifth.

In the A-3 Main, Joel Johnson had already secured the overall win, so he took a break and watched from the sidelines. Swauger took the early lead, while Pavidis, Hirosaka and Barry Baker followed like ducks in a row. With 1 minute to go, Hirosaka and Baker collided, and Hirosaka

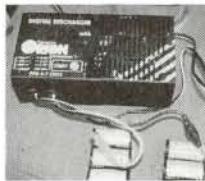
## New in the Pits

### Orion

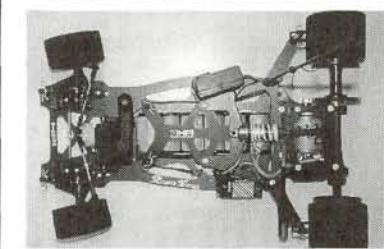
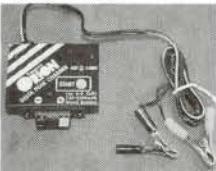


Philippe Neidhart from Orion\* demonstrated this new device, which was designed to improve battery-cell performance. He said that it was top secret, so I didn't get to peek inside the black box. Philippe told me that drivers from Associated, HPI and Peak Performance were using batteries that had been "trained" on the device with great success at the Electric Spring Challenge. The next generation of Orion matched cells will undergo this process before they are sold, so you can rest assured that the next pack of Orion cells you buy will be red-hot.

Also from Orion comes this new battery discharger. Orion's digital discharger accepts 6 or 7 cells. It discharges at 20, 25, or 30 amps, checks battery pack capacity and calculates a pack's remaining energy. Now you can rate your battery packs and determine which are the best. A cooling fan has been built into the discharger.



Here's another Orion product: the new Delta Peak Charger AT 3300. It is an entry-level charger that features an LED charge indicator and a 4A charge rate. Just connect your battery and push a button. The unit accepts 6 to 8 cells and 7.2 to 9.6 volts.



### HPI

This is a new Roadstar prototype from HPI. Kent Clausen told me that it features an in-line battery mount, HPI Super Shocks, a DA graphite chassis and a revised suspension geometry. This car is sure to be a force to be reckoned with, so stay tuned.

# HIGHWAY... WE'RE SPEEDING



**serpent.nl**

- Car set-up articles
- Track guides and set-ups
- Downloadable files
- Latest products info
- Race calendar and reports
- Links to R/C internet
- Experts' columns
- E-mail with the team
- PC race competition
- Prize-winning quiz
- and much more.....



SERPENT bv      The Netherlands  
SERPENT USA, Inc. Miami, Florida

## IFMAR WORLDS WARM-UP

### Winners

#### ■ F1 STOCK

Fin.	Qual.	Name	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Boyd Gaebel	Tamiya	Twister	Orion	Novak	Futaba	Protoform	Pro-Line/Pro-Line	Paragon	24/100
2	2	Dominic Alessi	Tamiya	Twister	Orion	Novak	Airtronics	Tamiya	Pro-Line/Pro-Line	None	n/a
3	3	Frank Malone	HPI	Maxtec	Orion	Novak	Airtronics	Andy's	n/a	Trinity	n/a

#### ■ SEDAN NOVICE

1	2	Chris Fisher	Yokomo	Stock	n/a	n/a	JR	n/a	HPI/HPI	None	28/78
2	3	Paul Stump	Yokomo	Maxtec	n/a	Novak	Airtronics	n/a	HPI/HPI	None	28/75
3	4	Kathy Welsh	Yokomo	Race Prep	Orion	Novak	Airtronics	n/a	HPI/HPI	None	29/78
4	1	Mark Peacock	Yokomo	Peak Perf.	Orion	Tekin	Airtronics	Elite	Yokomo/HPI	None	27/78

#### ■ SEDAN STOCK

1	2	Hendra	Yokomo	Maxtec	Orion	Tekin	Airtronics	HPI	Yokomo/HPI	None	27/57
2	1	Brian Fong	HPI	Maxtec	Dbl. Strike	Novak	Airtronics	n/a	HPI/HPI	None	36/108
3	5	Jim Welsh	Yokomo	Peak Perf.	Orion	Tekin	Airtronics	Elite	Yokomo/Yokomo	None	28/78
4	3	Peter Cruz	HPI	Peak Perf.	Orion	LRP	Airtronics	HPI	HPI	None	37/107

#### ■ SEDAN EXPERT STOCK

1	1	Ken Gerberding	Yokomo	Gamma	Crowe	Tekin	Airtronics	Elite	Yokomo	None	n/a
2	2	Raymond Patra	Kyosho	Maxtec	Orion	Tekin	Airtronics	n/a	HPI/HPI	None	26/75
3	4	Paul Freyre	Yokomo	Gamma	Orion	Tekin	Airtronics	Andy's	Yokomo/Yokomo	None	28/75
4	3	Wally Goenner	Yokomo	Gamma	Crowe	Tekin	Airtronics	Elite	Yokomo	Micro Burst	n/a

#### ■ SEDAN MOD

1	1	Masami Hirosaka	Yokomo	Reedy	Yokomo	Tekin	KO	Yokomo	Yokomo/Yokomo	Paragon	25/100
2	2	Yukio Wakasugi	Yokomo	Yokomo	Yokomo	Tekin	Futaba	Yokomo	Yokomo/Yokomo	None	24/78
3	2	Murai Masayuki	HPI	Peak Perf.	Orion	HPI	KO	HPI	HPI/HPI	Paragon	31/116
4	6	Hidekazu Ito	HPI	Peak Perf.	Orion	HPI	Airtronics	HPI	HPI/HPI	Paragon	35/116

#### ■ GTP NOVICE

1	1	Eduardo Cademartori	Assoc.	Trinity	Quest	Tekin	n/a	Parma	Pro-Line/Pro-Line	Paragon	21/78
2	2	Rene Racine	Assoc.	n/a	n/a	Airtronics	Airtronics	Andy's	Pro-Line/Pro-Line	n/a	24/104
3	3	Bryan Gaebel	TRC	Trinity	Sanyo	Novak	Airtronics	n/a	n/a	Paragon	20/78

#### ■ GTP EXPERT STOCK

1	1	Brian Rutherford	HPI	Race Prep	Dbl. Strike	Novak	Airtronics	Andy's	n/a	Microburst	21/90
2	2	Jimmy Wright	Yokomo	Gamma	Crowe	Tekin	Airtronics	Andy's	Jaco/Jaco	Microburst	26/120
3	3	Paul Truex	Yokomo	Gamma	Crowe	Tekin	Airtronics	Andy's	Jaco/Jaco	Microburst	28/120
4	4	Greg Larson	Yokomo	Maxtec	Stealth	Tekin	Futaba	Andy's	Jaco/Jaco	Coppertone	28/116

#### ■ GTP MODIFIED

1	4	Joel Johnson	Trinity	Trinity	Trinity	Helbing	Airtronics	Protoform	Jaco/Jaco	Trinity	25/120
2	2	Mike Swauger	Assoc.	Reedy	Orion	LRP	Airtronics	Andy's	Jaco/Jaco	Paragon	n/a
3	3	Masami Hirosaka	Yokomo	Yokomo	Yokomo	Tekin	KO	Protoform	Jaco/Jaco	n/a	n/a
4	1	Mark Pavidis	Assoc.	Reedy	Orion	LRP	Airtronics	Protoform	Jaco/Jaco	Paragon	23/116

#### ■ 1/12-SCALE MODIFIED

1	1	Masami Hirosaka	Assoc.	Reedy	Yokomo	Tekin	KO	Protoform	Jaco/Jaco	n/a	n/a
2	2	Joel Johnson	Trinity	Trinity	Trinity	Helbing	Airtronics	Protoform	Jaco/Jaco	Trinity	27/100
3	4	Josh Cyril	Assoc.	Reedy	Reedy/Orion	Novak	KO	Protoform	Jaco/Jaco	Paragon	26/100
4	5	Jon Orr	Assoc.	Reedy	Orion	Novak	KO	Protoform	Jaco/Jaco	Paragon	24/100

#### ■ GAS SEDAN

Fin.	Qual.	Name	Chassis	Engine	Radio	Body	Tires(F/R)	Traction Additive
1	1	Wen-Ping Chiang	Kyosho	O.S.	KO	HPI	HPI/HPI	Trinity
2	2	Chien-Hwa Chen	Kyosho	O.S.	KO	HPI	HPI/HPI	None
3	4	Larry Ingelson	Kyosho	O.S.	Airtronics	Kyosho	Pro-Line/Kyosho	None

fell back. Baker got away unscratched and passed Pavidis to secure second. Meanwhile, Josh Cyril came out of nowhere and passed Pavidis. Swauger finished first, Baker was second, and Cyril was third. The final standings were Joel Johnson first with a perfect 200 points, Mike Swauger second with 199 and Masami Hirosaka third with 196. This was definitely one of the most exciting classes.

• **1/12 Modified.** Top qualifier Masami Hirosaka took the lead with Joel Johnson on his tail and Mark Pavidis in tow. With 1 minute left, Johnson passed Hirosaka. Meanwhile, with 50 seconds left, Pavidis dropped out of the race, and Hirosaka's car dumped and slowed to a crawl. Johnson finished first with a big lead over Hirosaka, who managed to somehow stay in second while Jon Orr finished third.

In the A-2 Main, Hirosaka bolted ahead for a huge lead with Johnson in second. Johnson's car broke loose on the track, and a major pile-up put Tony Neisinger in

second and Josh Cyril in third. Johnson fell to seventh, but he managed to work his way back up to fourth. But with about 2½ minutes left, his car died. Hirosaka completed 29 laps to win the event. Josh Cyril was second, and Jon Orr was third.

In the A-3 Main, Johnson was on Hirosaka's tail, and he tried to pass several times, but Hirosaka held his ground. Johnson ran into the wall, and that allowed Pavidis to pass. During the last minute, Johnson passed Pavidis as Pavidis started to run out of juice. Hirosaka finished first with a huge lead. Johnson finished second with power to spare, and Josh Cyril crossed the line third. Hirosaka claimed victory with 200 points, Johnson finished second with 199, and Cyril was third with 197.

• **Gas Sedan.** The winners of this class were determined in a single Main. Top qualifier Wen-Ping Chiang started in the lead with Chien-Hwa Chen, Nelson Walker, Larry Ingelson and "Panama Red"

following. With about 2 minutes left, Chen flamed out but managed to finish second. Wen-Ping Chiang's car was the only one to finish 26; his time was 10:13.18. Chien-Hwa Chen finished second with 18/7:19.77, and Larry Ingelson finished third with 18/10:29.32.

#### WRAPPING IT UP

The fast-paced action of 1/12-scale and GTP racing and the true-to-scale realism of Sedan class made the Electric Spring Challenge an awesome sight for the spectators and racers. The crew at Revelation Raceway did a great job of making sure that all the qualifying heats and Mains ran smoothly. There's no doubt that the 1/12- and 1/10-scale IFMAR World Championships will be fantastic. For the first time in IFMAR history, touring cars will compete in an exhibition race, and in the near future, a touring-car racing class will be added to IFMAR's roster.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.



Tuning and modifying the  
ASSOCIATED

# RC10GT

by Brian Leslie

**A**SSOCIATED'S\* RC10GT is arguably one of the best  $\frac{1}{10}$ -scale gas trucks in the world. Associated has sold a ton of GTs over the past few years, and the trucks have had great success in local, national and world events. The RC10GT is a proven nitro-powered stadium racer, but could it perform even better? You'll have to read on to find out.



## RC10GT Suspension Update

The Team Associated drivers have been using prototype parts on their non-pull-start RC10GTs. The parts work so well that Associated has decided to make them available to the public. The front-shock strut (part no. 7216, \$12) gives the GT the same geometry as the electric RC10T2. It improves steering and rough-track handling. The rear-shock strut (part no. 7656, \$17) changes the shock-mounting geometry and improves rear traction. It also increases the truck's stability on rough tracks. Both parts come with a setup sheet that shows the optional settings for springs, pistons, oil, travel limiters and ride height. Associated has also introduced a narrow Lexan body called the GT II (part no. 6134, \$18) that is designed to fit over the new rear-shock strut. The new body will reduce drag because it's narrow, and it will improve handling. This body will not work with the pull-start versions of the GT.

• **Front end.** I started up front with the first set of upgrades. The RC10GT can be a bit unruly when it enters turns after a long straightaway hard on the power. Boasting  $\frac{1}{2}$ hp and more, today's .12-size engines can make any rear end skid. To add stability to the GT, I installed MIP's Stretch Kit, which lengthens the wheelbase  $\frac{3}{8}$  inch.

While I had the front end disassembled, I added MIP's Zero Maintenance Bellcrank kit. It features sealed ball bearings and glass-filled bellcranks for silky smooth, slop-free steering. I also added a Kimbrough\* heavy-duty servo-saver to the steering servo for added protection.

• **Suspension.** I replaced the stock steel tie rods and hinge pins with Lunsford's\* Punisher series titanium tie rods and hinge-pin sets. The way I drive, steel tie rods last about a day. I further strengthened the tie-rod area by replacing the stock ball cups with RPM's\* long shaft heavy-duty ball cups.

As I reassembled the suspension, I applied liquid thread-lock to the aluminum screws that hold the rear A-arm

mounts in place. The mounts are notorious for coming loose every few tanks of fuel.

Next, I replaced the stock shock shafts with MIP's Golden Shock Shafts and replaced the shocks O-rings with Blue Seal O-rings. There's nothing wrong with Associated's seals and shafts, but MIP's shock shafts are coated with titanium nitride to harden their surface and add life between rebuilds. I filled the front and rear shocks with Associated 35WT, 100-percent-silicone shock oil. I left the shock mounts, except for the front shocks, in the stock, middle-hole position. I used the inner hole position to mount the top of the shocks, laying them down slightly for more steering in the corners. I also kept the original springs—blue on the rear and gold on the front.

• **Powerplant.** I installed Dynamite's\* new TNT .12R engine. It has sealed crank bearings to avoid "wet-nose" problems, a heavy-duty piston rod, an O-ring-sealed carb with metal throttle arm, a pre-cut crankshaft, ABC construction for the piston and sleeve, a large red-anodized heat

sink and plenty of horsepower. In case of throttle-linkage or radio-system failure, I attached a light-duty spring that goes from the throttle arm to the engine mount. The spring acts as an emergency throttle return.

I also installed Stormer Racing's 1/8-scale air filter. It features a 90-degree elbow, and the unit prevents dirt from falling into the carb when you remove the filter for cleaning. Finally, I hooked up an MIP On-Board Temperature Gauge to keep an eye on engine temperature.

• **Exhaust.** I made a couple of changes in the exhaust system. First, I removed the header gasket and replaced it with some Permatex high-temp red RTV (part no. 27B). The gasket will only last a few teardowns before it breaks and starts to leak. Permatex RTV stops exhaust leaks and stands up well to the nitromethane fuel. When I reconnected the muffler to the header pipe I used Dynamite's Thermal-Grip coupler ties to avoid having pesky leaks around the silicone exhaust coupler.

## PARTS LIST

### MIP

- Stretch Kit—part no. 3011
- Zero Maintenance Steering Kit—3013
- Golden Shock Shafts 1.02—1048
- Golden Shock Shafts 1.32—1048
- Blue Seal Rebuild Kit—1043
- 4-N-1 clutch—3012
- Super Diff Rebuild Kit—3014
- CVD—1008
- On-Board Temp Gauge—3610

### LUNSFORD

- Punisher titanium hinge pins
- Punisher titanium tie rods

### DYNAMITE

- TNT .12R Motor—DYN6156
- Thermal grip coupler ties—DYN2259
- Super-sealed crank bearings—DYN6325

### DU-BRO

- Fuel fitting

### JR PROPO

- High-torque high-speed servo—NES-4735

### THUNDER TIGER

- ABC piston and sleeve—AN0547

### RPM

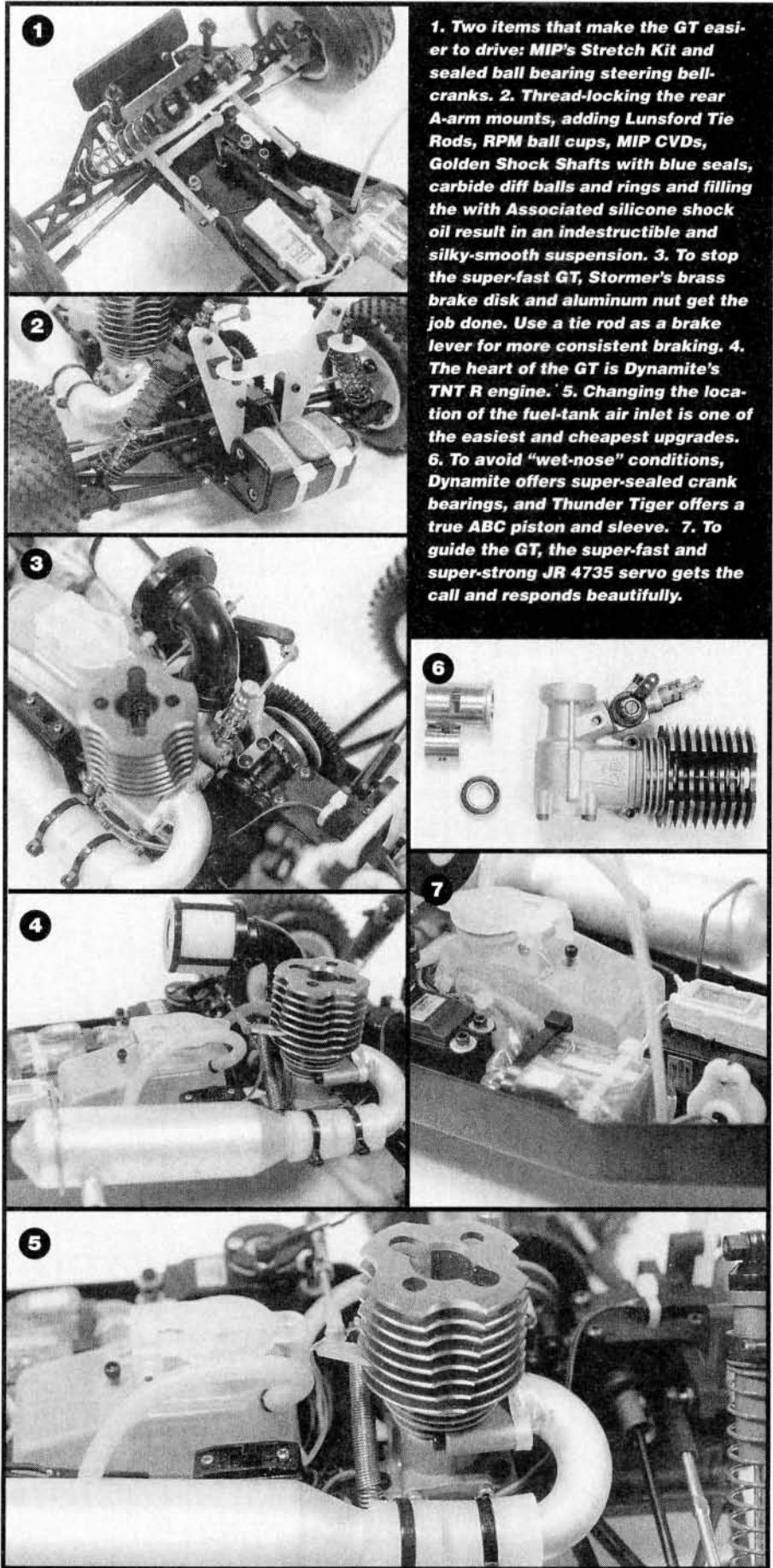
- Ball cups—7339

### PERMATEX

- Red RTV—27B

### FOURMOS

- Check valve—138



**1.** Two items that make the GT easier to drive: MIP's Stretch Kit and sealed ball bearing steering bellcranks. **2.** Thread-locking the rear A-arm mounts, adding Lunsford Tie Rods, RPM ball cups, MIP CVDs, Golden Shock Shafts with blue seals, carbide diff balls and rings and filling the with Associated silicone shock oil result in an indestructible and silky-smooth suspension. **3.** To stop the super-fast GT, Stormer's brass brake disk and aluminum nut get the job done. Use a tie rod as a brake lever for more consistent braking. **4.** The heart of the GT is Dynamite's TNT R engine. **5.** Changing the location of the fuel-tank air inlet is one of the easiest and cheapest upgrades. **6.** To avoid "wet-nose" conditions, Dynamite offers super-sealed crank bearings, and Thunder Tiger offers a true ABC piston and sleeve. **7.** To guide the GT, the super-fast and super-strong JR 4735 servo gets the call and responds beautifully.

I really like the Dynamite ties because they can be easily removed and reinstalled time and time again.

Next, I mounted a Du-Bro\* fuel fitting in the neck of the fuel tank. This gets the fuel-pressure tube off the bottom of the tank and out of the fuel. This way, the exhaust won't suck fuel out of the tank and into the pipe each time you let off the throttle. I plugged the old air inlet to the tank with a 4-40x1/4-inch capscrew. I also added a tie-wrap to the muffler end of the pressure tube to prevent it from popping out.

Another solution for out-of-the-pipe fuel loss is a check valve between the pipe outlet and the fuel-tank inlet. One of my friends has been using a Fourmost\* check valve for a year with great results.

• **Rear end.** I installed MIP's 4-N-1 clutch, carbide diff balls and hardened diff rings and CVDs; Stormer Racing's brass brake disk and aluminum brake nut; and I replaced the brake linkage with a steering-servo-size tie rod.

• **Radio equipment.** To guide my new GT "missile," I chose the JR Remote Control\* NES 4735 servo for steering, Airtronics\* 94151 for the throttle and brakes, and an Airtronics CS2P transmitter to control the whole enchilada.

#### PERFORMANCE

In the first drive with the new "missile," I noticed some changes: handling through the corners was much improved. The 4-N-1 clutch was key here because it stayed engaged longer, allowing me to use the engine as a brake when heading into a turn. Coming out of the corner, the clutch engaged smoothly, improving throttle control, while the Stretch Kit helped keep the rear end in check.

The feel of the upgraded GT is a big improvement on the stock version. The power is excellent, the brake action is superb, the suspension is equally smooth and the steering is tight and precise. I couldn't ask for anything more. The upgrades don't necessarily add tons of

speed to the truck, but they do make it easier to drive. The truck produced more consistent lap times and it's much more user-friendly.

The biggest bonus of the extras is durability. My hopped-up GT is now bulletproof. I can run tank after tank of fuel with zero downtime and low maintenance. I haven't broken any parts and I haven't had to make a ton of adjustments. Consistent lap times and additional track time are where it's at, and the upgraded GT delivers. Is it better? No doubt!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176. ■



# FREWER

INTERNATIONAL LTD



RADIO-CONTROL  
MODEL CAR EQUIPMENT



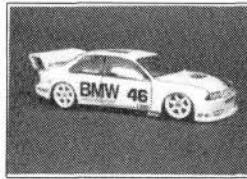
Here are just a few of our bodies  
for Tamiya, HPI, Yokomo, Kyosho,  
and Predator Sedans!



Alfa Romeo 155



Mercedes C180



BMW M3



Toyota Supra



Porsche 911 Carrera



Honda Civic

Now exclusively imported into the U.S from New Zealand by

## Japan R/C Imports

"Bringing you the best products from around the globe"

P.O. Box 7009-152  
Lafayette, CA 94549

**Free Catalog  
Call, Fax, or Write  
510 284-5778**

Also distributed by  
Global Hobby Distributors  
Hobby Warehouse  
Dealer Inquiries Welcome

From the track to the parking lot.  
This is the R/C action as **you** see it.

# Grassroots RACING

This is YOUR PAGE! That's what "Grassroots" means; go on, look it up. You know we're right. Which other magazine gives its readers an entire page to strut their stuff? Where else can you show the world—yes, everywhere from here to there—what you and your R/C friends are doing? Wanna brag? Here's the spot. Show us your local racing scene! Send photos with captions to "Grassroots Racing," *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035.



Above: the turn marshal places the last vehicle on the starting grid.

Left: Tumbleweed entrants.

Below: the pit tables are always busy as people prepare their rides to rumble (or should we say tumble?).

## Texas Off-Road Tumbleweed

Shawn Favre sent in this look at the 1996 Texas Off-Road Tumbleweed—a NORRCA event held at the Playfit Raceway in San Angelo, TX. Shawn says the indoor, off-road track is part of a 30,000-square-foot family entertainment complex with laser tag, pool tables, video games, a dance floor, two big-screen TVs and a great restaurant.

### WINNERS

#### ROOKIE TRUCK

- 1 Shawn Favre
- 2 Jerry Greenwood
- 3 Dennis Lee

#### ROOKIE BUGGY

- 1 Jeremy Nichols
- 2 Aaron Hayes

#### EXPERT MOD TRUCK

- 1 Jason Wilkey
- 2 Marcus Callahan
- 3 Tibby Stanley

#### EXPERT STOCK TRUCK

- 1 Johnny Gill
- 2 Dave Dydasco

#### SPORTSMAN STOCK BUGGY

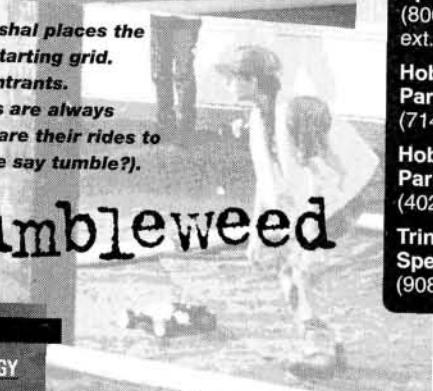
- 1 Ty Farmer
- 2 Matt Stanley
- 3 Ken Branum

#### SPORTSMAN STOCK TRUCK

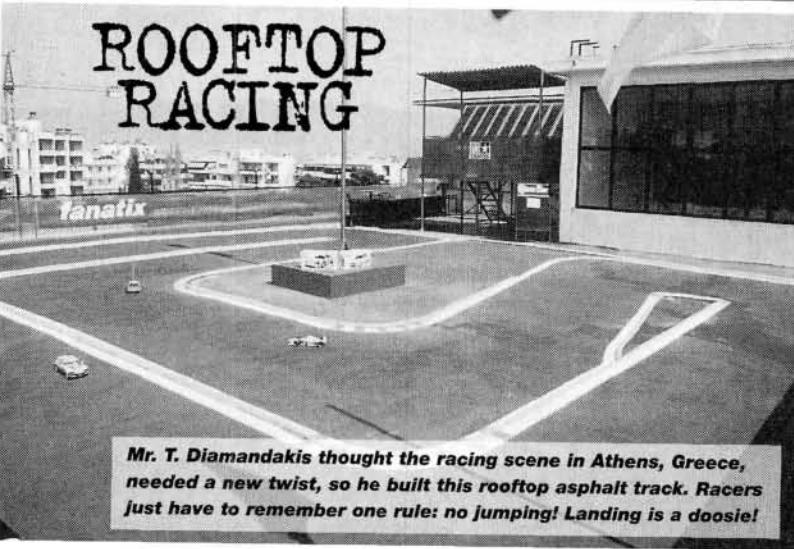
- 1 Ty Farmer
- 2 Deborah Wathen
- 3 Buddy Thigpen

#### SPORTSMAN MOD TRUCK

- 1 J. Scott Wathen
- 2 Dan Ankeny
- 3 Ken Branum

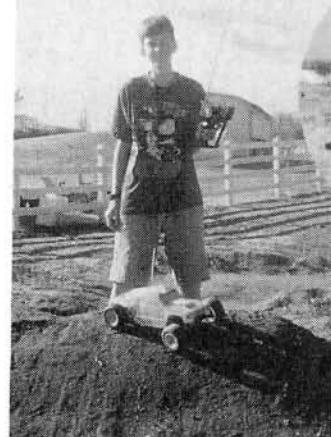


## ROOFTOP RACING



Mr. T. Diamandakis thought the racing scene in Athens, Greece, needed a new twist, so he built this rooftop asphalt track. Racers just have to remember one rule: no jumping! Landing is a doosie!

## California Kid



Green Acres is the place to be. Oh, sorry; it's actually Oakland Hills, CA, where Jimmy McCoy and his friend thrash on this RC10GT.

### call now!

Whether you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here are a few hotline numbers to call if you have any questions, or if you'd like to start a program in your area.

**Bolink Legend Series**  
(404) 963-0252

**Tamiya R/C Championship Series**  
(800) TAMIYA-A

**Kyosho R/C Sport Racing**  
(800) 682-8948  
ext. 085F

**Hobby Shack Parking Lot**  
(714) 964-8846

**Hobby Town USA Parking Lot**  
(402) 434-5050

**Trinity's Street Spec Series**  
(908) 862-1705

# SUPER KID SPANKS NATIONAL STREET SPEC FIELD!



**Left to right:** On-Trax owner Joe D. congratulates Justin Hansen on his fantastic win. Trinity's Rick Icker presents Justin with a new Trinity Team hat and jacket.

**S**treet Spec cars on a concrete oval? People said it couldn't be done, but they were proven wrong when round two of the Street Spec National Series got under way at the On-Trax Super Speedway in Browns Mills, NJ.

But the real story of round two was the outstanding performance of "The Super Kid"—13-year-old Justin Hansen. He is one of the track's local drivers, and with the support his father's pit work, he is virtually unbeatable—a fact that was again evident in the A-Main. To ensure that he would still be around at the end of the race, Justin wisely drove at a calculated pace. With less than a minute to go, he was in third when leader John Wohonus hit a wreck on the straight. This put Justin into second, and he gave George Verbonitz a run for his money until George's car met the same fate as John's. Justin went on to take the win, which also ensured him a place in the Invitational Main. The top three drivers in the Street Spec A-Main were invited to race against factory-sponsored racers Rick Icker, Dave Carpenter and Rob Cuttman. For most of the race, Justin stayed in Rick's shadow and didn't give Rob any room to pass. Then came the last laps: Jason and Rob's cars touched and spun. Justin caught a wall but managed to get unstuck in time to finish fifth. Thanks to Joe D. and his family for having the track in such excellent condition, and thanks to Trinity, Tekin and Bolink for providing the prizes.



**In the A-Main,** John Wohonus' Trinity Street Spec truck was an absolute rocket. The added surface wing did the trick on On-Trax's concrete surface.

## STREET SPEC A-MAIN

- 1 ..... Justin Hansen
- 2 ..... Richard DeCapio
- 3 ..... Jim Beachley

## INVITATIONAL A-MAIN

- 1 ..... Rick Icker
- 2 ..... Rob Cuttman
- 3 ..... Jim Beachley



**Top to bottom:** John Wohonus and his "rocket" Street Spec truck; Ed Thurresson was the TQ in the Street Spec class; Jim Beachley took third in the Street Spec A-Main; second-place finisher Richard DeCapio and his Bolink Street Spec car.



ADVERTISEMENT

## TEAM LOSI TECH TALK

### KEEP 'EM SEALED!

If you own a Double-X car, you're probably familiar with the special Teflon™-sealed front bearings. These seals help the bearings to last up to 10 times longer because they keep out dirt, dust and other unwanted particles. That's why Team Losi special-orders bearings with these seals for the Double-X. But they aren't standard items, and other sizes can be very costly. Team Losi has come up with a solution: they offer these seals as add-ons, and they're available for 3/16x3/8-inch bearings—part no. A-6918. They're used for the rear axle and the output shaft in the gearbox on both the Double-X and Double-XT and for the front wheels on the Double-XT.

Here's the easiest way to install these seals: first, using a sharp hobby knife, carefully remove the small retaining ring/clip that's around the outside of the standard shield. You'll need patience and a steady hand. Replace the shield with the Teflon™ seal, and then reinstall the small ring/clip. (These small rings/clips are easy to lose or damage, so extras are included with the Teflon™ seals.) Repeat this procedure on both sides of each bearing. If you're replacing shields on older bearings, it's a good idea to re-grease the bearings before you install the new seals.

### SEAL IT UP

If you run on sandy terrain and you use one of Team Losi's lightweight, aluminum top shaft/gear assemblies (or even if you don't!), you should seal your transmission housing. Follow these simple steps: when you've cleaned out and rebuilt the transmission housings to remove any build-up, lightly lube the gears in the transmission. Hydra-Drive fluid works well, or you can apply a thin coat of diff lube. Remember, you need only a little lube.

When you've lubed the gears, run a thin bead of diff grease along the top forward edge of the transmission housing—the area near the flange where the transmission housing is bolted to the rear bulkhead. The grease will help to form a seal when the transmission halves are bolted together. Having applied the diff grease, bolt the transmission halves together and wipe off any excess grease.

*Let us know what's going on! Address your questions and problems to Team Losi, "Tech Talk," 13848 Magnolia Ave., Dept. J, Chino, CA 91710.*

by Stan VanDuff

## The do's and don'ts of hooking up your electronics

# Install Radio Gear

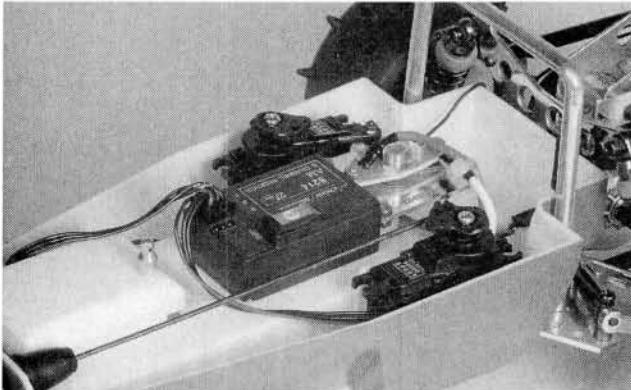
**C**ONFUSED about how to install all that electronic gear in your new ride? You're probably well aware that how and where you put your electronics will drastically affect your car's performance, but how do you proceed? Radio makers don't know which car or truck you have, and car and truck manufacturers don't know which electronics you use, so neither can give you complete guidance.

If you bought your electronics new, or if you were lucky enough to get the instructions with second-hand stuff, start by reading the instructions carefully. Rules for servo and receiver installation are fairly straightforward, but pay close attention to the instructions that come with electronic speed controls (ESCs). Incorrect installation

### SERVOS

You usually don't have to worry about how or where to mount the servo; the car's design will dictate the method and location. Off-road cars and parking-lot sedans have fixed mounting points to which you bolt the servos (these are no-brainers). On-road cars, on the other hand, often lack mounting hardware because of its weight. In these cars, use double-sided foam tape (or "servo tape" as it's called in the R/C world) to hold the servo in place. Be sure to choose high-quality tape, clean the surfaces well, and check the tape after every race.

Foam tape comes in a variety of thicknesses from  $1/32$  inch to  $1/8$  inch. Thicker tape provides more protection against vibration



**In some cars, the only way to mount electronics is with servo tape. In this old Cox Scorpion, the speed control and steering put so much torque on the servos that I had to replace the servo tape every few races.**

can cause radio interference and possibly damage the speed control.

Keep two things in mind when you install radio gear: first, mount your electronics in a way that is secure and reduces shock and vibration. Second, choose locations that will minimize radio interference (as far away from the motor as possible, etc.).

Start with the easy stuff—the servos.

**A good soldering job. Capacitor leads are short, and the solder is smooth and kept to a minimum.**



**Servos must be taped down solidly, or you will get mushy steering. Clean the servo (and the chassis) with denatured alcohol, and trim the tape to a perfect fit.**

but will make your steering mushy because the servo will "squirm" around as it tries to steer the car. I use the thinnest tape I can find.

Even in a new car, you should clean the servo and the chassis with a strong cleaner such as denatured alcohol (from the hardware store) or lighter fluid. Rubbing alcohol (isopropyl) is pitifully weak for cleaning. You can use motor spray, but make sure your brand is guaranteed to be safe for plastic. Wait until everything is dry before you apply the tape.

Cut a piece of tape that will completely cover the servo's flat side. Don't let the tape hang over the side or even cover the servo's radiused corners. If you have excess tape, dirt will collect in the crack between the chassis and the servo. Vibration will drive dirt under the servo, and in the middle of an important race, the servo will fly off. Many racers spread Shoe-Goo around the servo because it

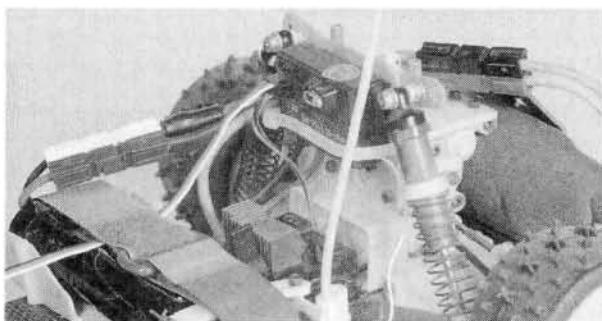


never lets go. To remove the servo, pry it off with a flat-blade screwdriver.

If you use servo tape to save weight and then have to add weight to meet race requirements, do yourself a favor: use servo mounts, and do away with the servo tape and the Shoe-Goo. It's just easier that way!

#### RECEIVER

The receiver is the most delicate piece of gear in your car. It is also quite expensive to recalibrate, repair, or replace. I have had several problems with receivers, so I take extra precautions when I mount one. I carefully choose the spot where I mount



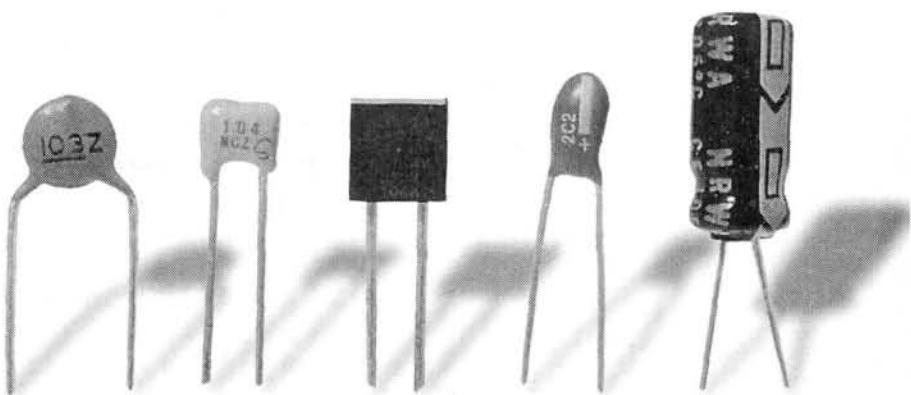
**On this graphite RC10, I had to mount the receiver on the shock tower to eliminate glitching. Note how the motor and battery leads are routed far from the antenna.**

it, too. Keep it away from other electronics and large metallic objects.

If your car or truck has an aluminum-tub chassis, you may have radio problems with the receiver mounted down in the chassis. Some drivers even report trouble with carbon-fiber (graphite) chassis. In these cases, try mounting the receiver on the rear shock tower. Another option is to build a fiberglass shelf above the battery.

Receivers are susceptible to vibration and contamination (rocks, dirt, carpet fuzz, water and fuel). If anything gets inside the receiver case, it will probably cause glitching or signal loss. You've probably already read that nitro-burners put their receivers in balloons to keep fuel out. This is an absolute must on nitro buggies because fuel can easily penetrate the receiver. When it evaporates, it leaves a sticky oil film that is practically impossible to remove without an ultrasonic cleaning tank, so you would have to send the receiver back to the factory.

I've started to put my electric off-road receivers in balloons, too. One friend thought I was being extreme, but when his car started to glitch like crazy, I popped open his receiver case to show him a thimbleful of dirt. The balloon didn't seem like such a bad idea after all.



**Capacitors (left to right): .01-microfarad disk, a pair of .01-microfarad monolithic ceramic, 2.2-microfarad tantalum, 47-microfarad aluminum electrolytic.**

When I don't use a balloon, I mount the receiver with  $\frac{1}{8}$ -inch-thick foam tape from the hardware store (I haven't seen the thick stuff in hobby stores). I also use Velcro®-brand fasteners on a number of cars so that I can move the receiver from one car to another. The Velcro® has never let go of the receiver, but it is springy enough to damp vibration.

I put a piece of  $\frac{1}{4}$ -inch latex foam (from the airplane side of the hobby store) under the receivers of cars I use balloons on. A pair of nylon cable ties holds everything in place. Compress the foam just enough to make sure that the receiver doesn't slip out from under the cable ties, but not so much that it won't damp vibration.

Probably the most important aspect of mounting the receiver is the way you route the antenna. Never cut off the antenna; a shortened antenna won't pick up as much signal. Even worse, it will "detune" your receiver, so it won't pick up your signal as well and will be more prone to interference. Wrap up excess antenna wire into a neat bundle, and secure it with a tiny cable tie. Try to keep the antenna away from the speed control and power leads. If you have to cross the motor or battery leads, cross them at right angles to minimize interference.

#### MOTOR

Mounting a motor is as simple as can be, but I have to emphasize the importance

of installing capacitors correctly. Glitching has to be racers' number-one complaint, and much of it can be attributed to motor capacitors. If you don't feel comfortable soldering your own capacitors on, ask a friend, or take your motor to your favorite hobby shop and very politely ask the folks there whether they would mind putting them on for you.

You will use one of two capacitor configurations, depending on whether you have a low-frequency or high-frequency ESC. If you have an older low-frequency ESC, solder a single 47-microfarad 25V aluminum electrolytic capacitor (looks like a miniature soft-drink can) between the positive and negative lugs where the leads are attached.

For high-frequency ESCs, solder a 0.1-microfarad 50V ceramic capacitor (a little square thing) from the motor lug to the motor can and a 2.2-microfarad 25V tantalum capacitor (looks like a candy-coated



**A balloon will keep dirt and crud out of your off-road receiver whether you run nitro or electric.**

micro-peanut) between the lugs. Some companies recommend slightly different values, so consult your ESC's instruction sheet. If you don't have the one that came with your controller, call the factory or borrow one from another R/C racer.

Be sure to solder the positive lead of the electrolytic or tantalum capacitor to the positive lead of the motor. If your

# Race Prep HACK ATTACK Now With HYPERWIRE



The

## POWERZONE

unleashes the most powerful Stock Racing Motor ever! The Hack Attack is now wound with HYPERWIRE. A super low resistance armature wire that produces higher efficiency with lower resistance. The bottom line is **MORE HORSEPOWER!**

The HACK ATTACK also features the R-40 Armature with Cooling Channels, Weighted Balancing Method, Diamond Trued Commutator, Black 1.3mm Can with Air Vents, 5.3v Wet Magnets, "H" Cut Lay Down "R" Brushes, Dyno Tested and packaged with the results. Includes 3 Capacitors and a Decal Sheet.

The 24 degree ROAR 96 HACK ATTACK is the only stock motor Built in the U.S.A.!!



P.O. Box 494, Paulden, AZ. 86334  
(520) 636-1955 Fx 5206361956

## INSTALL RADIO GEAR

speed control has reverse, go to an electronics store and buy a non-polarized (no negative or positive side) capacitor of the correct value. If you put reverse voltage on an electrolytic or tantalum capacitor, you will destroy it.

Many motors come with two sets of lugs. Some people solder the capacitor(s) to one set and the power leads to the other. This may work fine, but it is best to put the wires and capacitors on the same lugs. The goal is to prevent voltage spikes from going up the power leads, and even a small gap between the capacitors and the wires can reduce effectiveness.

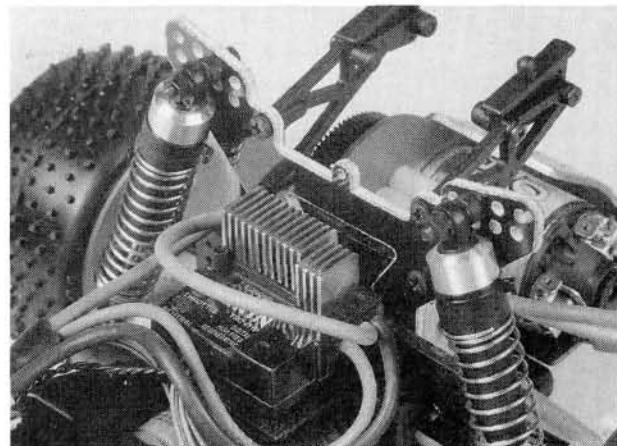
For low-turn modified motors, you may need one or two Schottky diodes on the motor. I believe that some of Novak's\* racing controllers require the diode with all motors. Other manufacturers build diodes that can handle milder motors into the controller. Follow the instructions that came with your speed control, and keep in mind that the positive lead of the diode goes to the positive lug on the motor. Diodes are marked in one of three ways: they have a plus (+) sign or a single stripe on the positive end, or they use the schematic symbol of a diode with the arrow pointing toward the positive end.

Check your capacitors and diodes often. They are subjected to extreme heat, vibration and current, so they can break or burn out without warning.

### SPEED CONTROL

ESCs are pretty rugged and nearly impervious to dust and vibration. Mount the ESC in a spot that allows you to keep your motor and battery leads short and provides the heat sink with plenty of airflow. In most off-road applications, the best place for the ESC is on the rear shock tower. For the record, though, many 2WD off-road racers prefer to mount the ESC and the receiver across from each other on the chassis for better weight distribution (balance).

Off-road truck racers usually mount the receiver on the chassis and put the speed control on the shock tower. This way, the receiver and antenna are far enough from the motor and battery wires. At the same time, the motor and battery wires can be as short as possible, and the ESC gets plenty of cooling air. This is my favorite combination.



Though a shelf above the battery makes changing batteries a little tougher, it may be the best place for the ESC.

On most pan cars, you can put the receiver and speed control on opposite sides of the chassis. This keeps them apart, and that improves weight distribution and lowers the center of gravity.

You can secure the ESC with servo tape (thick or thin) or Velcro® as you did with the receiver. ESCs are heavier than receivers, so they sometimes become loose when mounted with Velcro®. I've never had one damaged when it became loose, but it is rather embarrassing to drive around the track with the ESC dragging on the ground. If you use the same ESC in more than one car, make sure that your leads are long enough for each car. You can always shorten the wires, but they are hard to lengthen. Some Tekin\* ESCs have external soldering posts for the motor and battery wires, and that's a really nice feature.

### JUST DO IT!

Since you're doing such a nice job installing your radio gear, it's time to get rid of those power-robbing Tamiya-style battery connectors. Those low-budget connectors are appropriate only for casual driving in box-stock cars. Any of the aftermarket connectors would be a major improvement. For more information on choosing the right battery connector, check out John Rist's "Connector Inspector Round 2" article in the September '95 issue of *R/C Car Action*.

Now get to work. Install your new gear properly. Your ride will look better, and you won't have to worry so much about glitching. The next time I see you at the track, I'll be checking up on you!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 176.

## A simple technique to avoid splinters and splits

by Doug Mertes

**F**IBER-REINFORCED graphite is wonderful stuff. Lighter and more resistant to flexing than fiberglass, graphite equipment is the choice of racers who are looking for a competitive edge.

Full-scale Formula 1, Indycar and World Sports Car (WSC) chassis builders all primarily use carbon graphite, although their parts tend

# Prep & Seal Graphite Parts

to be molded and joined, rather than simple flat plates. Among R/C drivers, graphite is used for chassis plates, pod parts, suspension plates and even T-bars. If you own a  $\frac{1}{10}$ - or  $\frac{1}{12}$ -scale pan car, an F1 car, or even an off-road truck or buggy, you probably have some experience with this incredible space-age material.

Although there are many subtle manufacturing variations, graphite plate is all made in more or less the same way: layers of absorbent carbon fiber are laid crosswise to each other (the manufacturers all seem to swear by different "correct" angles) and then soaked in a graphite-laden self-curing epoxy mixture in a shallow pan-type device that carefully controls the thickness of the plate as it hardens. The finished plate is cut, trimmed and finished to standard factory sizes—usually, 4x8-foot sheets. If required, special construction specifications, e.g., for angled front kickups or rear-pod plate spur-gear protectors, may be accommodated during the molding process.

Though it has many advantages compared with fiberglass and plastic, graphite parts usually require some finishing work. Their edges have usually been cut with a saw or a high-speed router, and there's always a chance that anyone who handles them will get splinters—really painful, and difficult to remove. Rough chassis plate or pod edges can also catch on the carpet used on indoor tracks. Even worse, during a bad crash, unsealed graphite parts can split or "delaminate" (the fiber sheet layers separate) and leave you with a major, expensive rebuilding job. To prevent this from happening, sand and seal the edges of the graphite. Follow along as I treat a few parts used in some popular pan cars.

1

You'll need some 400- to 600-grit wet-or-dry sandpaper (anything in that grit range will do), a few cotton-tipped swabs (like Q-Tips™), medium CA (the thin stuff just runs off, and the thick stuff doesn't penetrate as well), and water (a running faucet, or a plastic tub filled with water), and, if you use dry sandpaper, a mask to help you avoid inhaling any graphite dust.



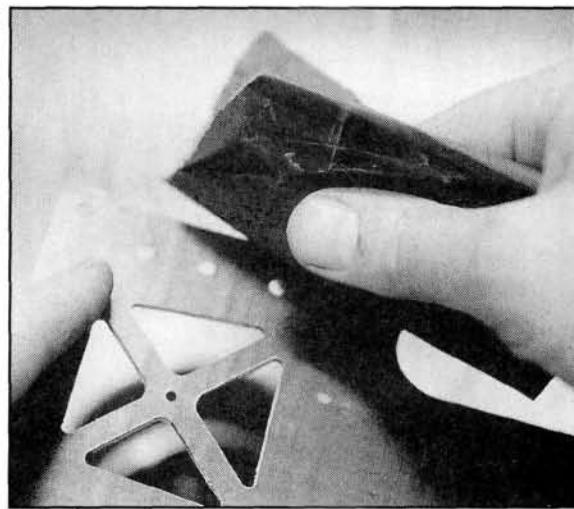
2



If you use a pan-car chassis that has battery slot cutouts, chamfer the slots' edges with a flat file or a sanding drum mounted on a rotary tool. This ensures that the edges won't cut through the battery shrink-wrap and cause a short circuit. When your chassis is ready to prep, head for the sink with your sandpaper.

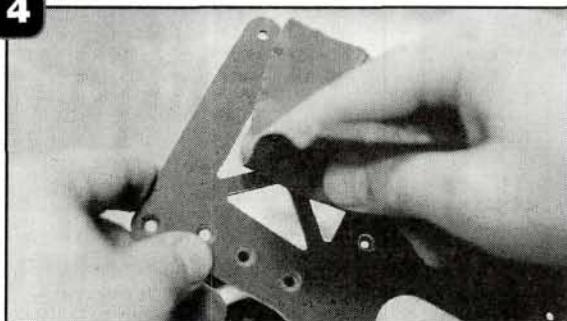
Start with the chassis plate's edges: under just a trickle of warm water, sand the upper and lower edges. The water will wash the graphite dust off, and you won't inhale the dust or get it all over your hands. Be careful of splinters!

3



## HOW TO PREP AND SEAL GRAPHITE PARTS

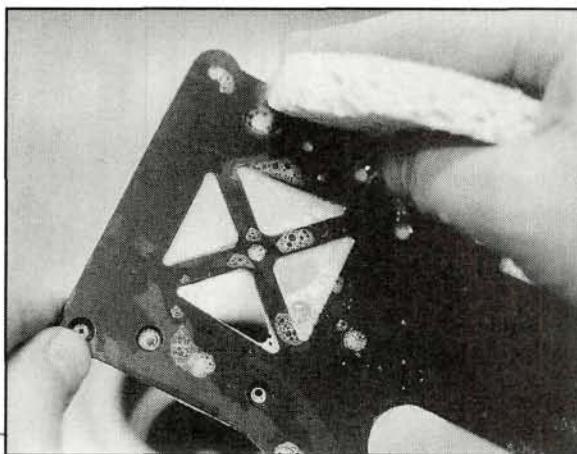
4



Having sanded the edges all around, work on any cutouts.

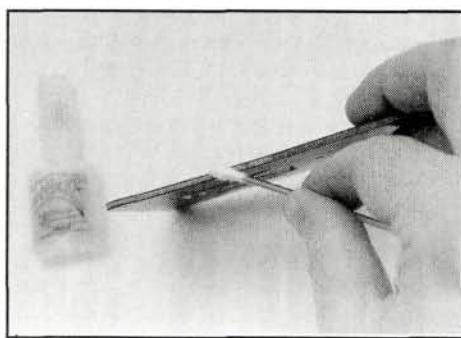
5

Wash the graphite parts with soap and plenty of warm water, then carefully dry them with paper towel or a soft, clean cloth.



Now seal the edges. Drip a little CA onto a cotton swab, and run the swab along the edges of the chassis and the rims of the cutouts. If you seal half the chassis at a time, you'll avoid gluing your hand to the part! You'll have to change swabs often because the glue hardens.

6



You've finished! The edges should be smooth and shiny and a darker color than they were before you sealed them. You're now ready to put the rest of the car together, confident in the knowledge that your graphite parts are as good as you can make them. ■

# LUNSFORD Racing

Let us remove the word "broken" from your racing program



RC 10 Worlds and RC 10T



LOSI XX and XXT

Lunsford Industries, Inc. • 2500 Three Lakes Rd., Suite A, Albany, OR 97321 Phone: (541) 928-0587 Fax: (541) 967-5917

## INDEX OF MANUFACTURERS

<b>Airtronics</b> , 15311 Barranca Pkwy., Irvine, CA 92718; (714) 727-1474; fax (714) 727-1962.	<b>GHI/Ultimate Hobbies</b> , 2374 N. Orange Mall, Orange, CA 92665; (714) 921-0322; fax (714) 921-0380.	<b>MSC</b> , 151 Sunnyside Blvd., Plainview, NY 11803; (800) 645-7270; (800) 255-5067.	<b>Sanyo Corp.</b> , 2001 Sanyo Ave., San Diego, CA 92173; (619) 661-6620; fax (619) 661-6743.
<b>Associated Electronics</b> , 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; (714) 850-1744.	<b>Hobbico/Great Planes Model Distributors</b> , P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-3630; fax (217) 398-0008.	<b>Mugen USA, Ltd.</b> , 402-404 7th Ave., Ste. 404B, Brooklyn, NY 11215; (718) 251-7660.	<b>Schumacher Inc.</b> , 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; (813) 889-9593.
<b>Badger Air-Brush Co.</b> , 9128 W. Belmont Ave., Franklin Park, IL 60131; (708) 678-3104.	<b>HPI</b> , 22600-C Lambert, Ste. 904, El Toro, CA 92630; (714) 837-3250; fax (714) 837-3251.	<b>Novel Electronics Inc.</b> , 18910 Teller Ave., Irvine, CA 92715; (714) 833-8873; (714) 833-1631.	<b>Stormer Hobbies</b> , 23 High Speed Rd., P.O. Box 126, Glasgow, MT 59230-0126; to order (800) 255-7223; (406) 228-4569; fax (406) 228-8152.
<b>Boca Bearing Co.</b> , 7040 W. Palmetto Park Rd., Ste. 2304, Boca Raton, FL 33433; (407) 998-0004; fax (407) 998-0119.	<b>Jammin' Products</b> ; distributed by Team Losi (see address below).	<b>OFNA Racing</b> , 22600 D Lambert, Ste. 1009, Lake Forest, CA 92630; (714) 586-2910; fax (714) 586-8812.	<b>Tamiya America Inc.</b> , 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; fax (714) 362-2250.
<b>BRP Products</b> , 1575 Lowell St., Elyria, OH 44035; (216) 284-0270; fax (216) 284-0271.	<b>JR</b> ; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.	<b>O.P.S. Engines</b> ; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.	<b>Team Associated</b> , 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; fax (714) 850-1744.
<b>Competition Electronics</b> , 3469 Precision Dr., Rockford, IL 61109; (815) 874-8001.	<b>Kimbrough Products</b> , 1322 Bell Ave., Unit 1-C, Tustin, CA 92680; (714) 258-7425; fax (714) 258-7426.	<b>Orion</b> , distributed by Peak Performance (see address below).	<b>Team Losi</b> , 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.
<b>Corally</b> ; distributed by Du-Mor R/C, 1002 Union Landing Rd., Cinnaminson, NJ 08077; (609) 829-1338; fax (609) 829-9303.	<b>Kyosho/Great Planes Model Distributors</b> , 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.	<b>Pactra Inc.</b> , 620 Buckbee St., Rockford, IL 61104; (815) 962-6654.	<b>Tekin Electronics</b> , 940 Calle Negocio, San Clemente, CA 92673; (714) 498-9518; fax (714) 498-6339.
<b>Deans Connectors</b> , 7628 Jackson St., Paramount, CA 90723; (310) 634-9401.	<b>Litespeed</b> , P.O. Box 4765, Spokane, WA 99202; (509) 535-2717.	<b>Peak Performance</b> , 23532-J Madero Rd., Mission Viejo, CA 92691; (714) 707-4683; fax (714) 707-4684.	<b>Tenth Technology</b> , Shornebury Pear Tree Lane, Shorne, Kent, England, U.K., DA123JX; (047) 482-4444.
<b>Dremel Tools</b> , P.O. Box 1468, Racine, WI 53401-1468; (414) 554-1390; fax (414) 554-7654.	<b>Locite</b> , 18731 Cranwood Ct., Cleveland, OH 44128.	<b>Pro-Line</b> , P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.	<b>Testor Corp.</b> , 620 Buckbee St., Rockford, IL 61104; (815) 962-6654; fax (815) 962-7401.
<b>Du-Bro Products</b> , P.O. Box 815, Wauconda, IL 60084; (800) 848-9411; (708) 526-2136; (708) 526-1604.	<b>Lunsford Racing</b> , 2500 Three Lakes Rd., Ste. A, Albany, OR 97321; (503) 928-0587; fax (503) 967-5917.	<b>RAM Radio Controlled Models</b> , 229 E. Rollins Rd., Round Lake Beach, IL 60073; (847) 740-8726; fax (847) 740-8727.	<b>Thorp Engineering Corp.</b> , 1715 East Fairfield, Mesa, AZ 85203.
<b>DuraTrax</b> ; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.	<b>LRP Electronic</b> , Wilhelm-Enssle-Str. 134, 7064 Remsalden, Germany.	<b>RCPS</b> , 18312 Gifford St., Fountain Valley, CA 92708; (714) 962-6928.	<b>Thunder Tiger USA</b> , 2430 Lacy Lane #120, Carrollton, TX 75006; (214) 243-8238; fax (214) 243-8255.
<b>Dynamite</b> ; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.	<b>Maxtec Development</b> , 3740 Overland Ave., Ste. B, Los Angeles, CA 90034; (310) 815-0251; fax (310) 815-0253.	<b>Reedy</b> ; distributed by Associated Electronics Inc. (see Team Associated).	<b>TRC</b> , P.O. Box 1058, 210 Charter St., Albemarle, NC, 28002; (704) 982-0507; fax (704) 982-0572.
<b>Fourmost Products</b> , 4040 24th Ave., Forest Grove, OR 97116; (503) 357-2732.	<b>Miniatronics</b> , 561K Acorn St., Deer Park, NY 11729.	<b>Royal Products Corp.</b> , 790 W. Tennessee Ave., Denver, CO 80223; (303) 778-7711; fax (303) 778-7721.	<b>Trinity Products</b> , 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.
<b>Futaba Corp. of America</b> , P.O. Box 19767, Irvine, CA 92713-9767; (714) 455-9888; (714) 455-9899.	<b>MIP</b> , 746 E. Edna Place, Covina, CA 91723; (818) 339-9008; fax (818) 966-2901.	<b>RPM Inc.</b> , 14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.	<b>Wiha Corp.</b> , 1400 E. Broadway, Box 660, Monticello, MN 55362; (612) 295-6591; fax (612) 295-6598.
	<b>Motor Man</b> ; distributed by Hobby Warehouse of Sacramento, 8950 Osage Ave., Sacramento, CA 95828; to order (800) 333-3640; (916) 381-7588; fax (916) 381-7589.	<b>Robinson Racing Products</b> , 4968 Meadow View Dr., Mariposa, CA 95338; (209) 966-2465; fax (209) 966-5937.	<b>Yokomo Ltd.</b> ; distributed by GHI/Ultimate Hobbies (see address above).

## ADVERTISER INDEX

Ace Hardware Hobbies .....	126-129	Hammad Ghuman .....	61	Race Prep Racing Motors .....	150
Advanced Products .....	114	Hitec .....	137	Race Shed .....	138
Airtronics .....	4	Hobby Etc., Inc. ....	175	R/C Car Action Classifieds .....	162
America's Hobby Center, Inc. ....	168-169	Hobby Products International .....	24-25	R/C Car Action Tech Center .....	151
Associated Electronics .....	23,30-31,36-37,69,79,139,174	Hobby Shack .....	73	RCHTA .....	103
B&B Software .....	103	Hobby Tow .....	60	Robinson Racing Products .....	121
B&T R/C Products .....	143	Hobby Warehouse of Sacramento .....	144, 147	RPM .....	123
Badd Boyz Batteries .....	114	Honda House Motor Speedway .....	138	Savon Hobbies .....	159-161
Boca Bearing .....	103	Japan R/C Imports .....	106,107	Schumacher, Inc. ....	122
Bolink R/C Cars, Inc. ....	170	K&M Racing .....	118	Serpent Model Racing Cars .....	98-99
Bruckner Hobbies .....	74-75	KO Propo .....	85	Sheldon's Hobbies .....	108-111
Burien Toyota .....	118	Kyosho .....	14-15,89,113,124,136,173	Stormer Hobbies .....	116-119
C&M Manufacturing .....	172	Lunsford Racing .....	166	Tamiya .....	C2,34-35
Calandra Racing Concepts .....	77	MIP .....	125, 158	TD Enterprises .....	103
Competition Electronics .....	114	Maxmod Mini Sports .....	115	Team Losi .....	12-13,78,101,167
Computer Player .....	171	Maxtec Development .....	43	Tekin Electronics .....	86,102
Coverite .....	84	Model Rectifier Corp. ....	C4	Thunder Tiger .....	40
Davis Diesel Development .....	118	Niftech .....	60	TJ Model .....	120
Deans .....	163	Novak Electronics .....	16,21,47	Tower Hobbies .....	152-157
Dillon Racing .....	77	Omni Models .....	132-135	Traxxas Corporation .....	112
DTN Enterprises .....	115	Parma International, Inc. ....	77,94,138	Trinity .....	3,8,9,10,11,18-19,29,66,90-91
Dynamite .....	82	PC/RC .....	26	World Class, Inc. ....	143
Frewer .....	106	Peak Performance .....	88,141,142	Yokomo .....	54-55
Full Speed Racing .....	138	Pro Match .....	84		
Futaba .....	140	Pro-Line USA .....	7,182,C3		
GTX .....	167	Progressive Technologies .....	87		

# PRO-LINE

# TRACK DIRECTORY

## YOUR 1996 TRACK GUIDE

**FREE!** Track owners! You can be included in this directory, brought to you by Pro-Line. Just fill out the coupon on page 176 of this issue and send it to: Track Directory, *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897.

### ALABAMA

**Berry R/C Raceway**, Main St., Berry, AL 35543; Ronny, Don, (205) 932-3189



**Phenix Raceway & Hobby**, 2006 Opelika Rd., Phenix City, AL 36867; Chris Watson, (334) 298-9200



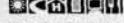
**R/C Hi-Tech Raceway**, 3303 Meridian St., Huntsville, AL 35811; Rick Chambers, (205) 539-1347.



**Lagoon Park R/C Raceway**, 2730 Lagoon Park Dr., Montgomery, AL 36109; Alex Love, (334) 272-6438



**Spring Cove Speedway**, Rt. 1, Box 95, Florence, AL 35630; Chuck or Lyda Sybolt, (205) 757-5998



**Thunder Road Speedway**, 108 Park Rd., Pleasant Grove, AL 35127; Jim or Cheyenne Kearny, (205) 744-0107



### ALASKA

**ARCORR**, 2812 Spender Rd., Anchorage, AK 99503; Jim Rafuse, (907) 277-7778



### ARIZONA

**Fast Line Hobbies**, 2141 S. Industrial Pk. Ave., Tempe, AZ 85282; Rob Zoller, (602) 966-8166



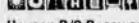
**Finish Line Raceway**, 7025 E. 21st. St., Tucson, AZ 85710; Justin, (520) 747-3633



**Frank's Hobby House**, 19401 N. Cave Creek Rd., Phoenix, AZ 85024; Marty, (602) 992-3495



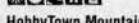
**G&S Raceway**, 967 Hancock, Bullhead City, AZ 86442; Bob Olsen, (520) 758-1100



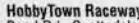
**Havasu R/C Raceway**, 1400 S. Smoketree (Rotary Park), Lake Havasu, AZ 86403; Jeff Roe, (520) 855-2226



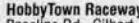
**High Desert Raceway**, 2570 Neal Ave., Kingman, AZ 86401; Bryce Cole, (520) 757-4498



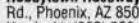
**HobbyTown Mountain Raceway**, 4431 S. White Mountain Rd., Showlow, AZ 85901; Dennis, (520) 537-9373



**HobbyTown Raceway**, 9180 E. Indian Bend Rd., Scottsdale, AZ 85250; Dennis, (602) 948-3946



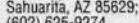
**HobbyTown Raceway**, 1915 East Baseline Rd., Gilbert, AZ 85234; Kenny, (602) 892-0405



**Hobbytown Raceway**, 2814 W. Bell Rd., Phoenix, AZ 85023; Mike Kaminski, (602) 993-0122



**Hobbytown Raceway**, 1102 E. 22nd St., Tucson, AZ 85704; Adam Crippen, (520) 882-8888



**Quarter Flash's Squirlin' Dirt Raceway**, 16301 S. Santa Rita #C, Sahuarita, AZ 85629; Dave or Randy, (602) 625-9274



**R/C Sports Mania**, 3550 N. 35th Ave., Phoenix, AZ 85017; Brian Dick, (602) 278-3671



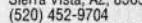
**Scottsdale R/C Raceway**, 3023 N. Scottsdale, Scottsdale, AZ 85251; Scott Anfinson, (602) 945-2186



**Speedway Hobbies**, 1000 N. Humphreys St., #204, Flagstaff, AZ 86001; Gary McAllister, (602) 556-0710



**Trax Raceway**, 401 E. Wilcox Dr., Sierra Vista, AZ 85635; Sam Schaler, (520) 452-9704



**USA Speedway**, 5947 W. Alameda, Glendale, AZ 85310; Michael Fleek, (602) 516-1398



### ARKANSAS

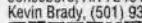
**A.R.C.C.A.**, 13703 Pleasant Hill Rd., Little Rock, AR 72209; Jim Kifer, (501) 455-2221



**Flyin' W R/C Raceway**, 957 B. Sunrise Ave., Springdale, AR 72762-3944; Brian or James Watkins, (501) 750-7716



**R/C Motorplex**, 204 Best Industry Dr., Jonesboro, AR 72401; David Hill or Kevin Brady, (501) 931-3278



**Sparks R.C. Raceway**, 7194 Greene 721 Rd., Paragould, AR 72450; Tommy or Daniel Sparks, (501) 239-3606



### CALIFORNIA

**California City R/C Car Track**, 8349 Jacaranda Ave., California City, CA 93505; (619) 373-3765



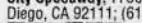
**Cameron Park Raceway**, 1305 Cameron Ave., West Covina, CA 91790; Carl A. McVey, (818) 962-1120



**Cafe West/Hawk's R/C Raceway**, 1201 West 10th St., Antioch, CA 94509; Jerry Winkelbauer, (510) 779-1665



**Chico's 20th Street Raceway**, 236A W. East Ave., Chico, CA 95926; David Brown, (516) 893-6443



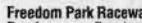
**City Speedway**, 7750 Convoy Ct., San Diego, CA 92111; (619) 560-9633



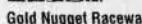
**Cloverdale R/C Raceway**, 1 Citrus Fair Dr., Cloverdale, CA 95425; Bob Eulie, (707) 894-4468



**D&D Raceway**, 290 S. 1st Street, Turlock, CA 95380; Dave Miller or Lee Cisco, (209) 667-0907



**Fast Lane**, 25845 San Fernando Rd., #21, Saugus, CA 91350; (805) 255-2404



**Freedom Park Raceway/Ventura Roadrunners**, Freedom Park Dr., Camarillo, CA 93010; Wayne Evans, (805) 656-RACE



**Gold Nugget Raceway**, 4650 Skyway, Paradise, CA 95969; Marvin's R/C hobbies, (916) 877-7363



**Greater Los Angeles R/C Racing Club**, 3756 Cardiff Ave., #305, Los Angeles, CA 90034; Nikko Ko



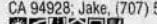
**Hobby Paradise Raceway**, 1880 Art Gonzales Pkwy., Selma, CA 93662; Steve Keiser, (209) 896-4804



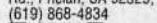
**Hobby Warehouse**, 5500 So. Watt, Sacramento, CA 95828; Roger Hubbard, (916) 381-7587



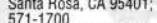
**Jake's Performance Hobbies**, 6650 Commerce Blvd., #21, Rohnert Park, CA 94928; Jake, (707) 586-3375



**JC High Desert Raceway**, Gorgonio Rd., Phelan, CA 92329; JC Fletcher, (619) 868-4834



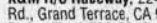
**JD Hobbies**, 1009 W. College Ave., Santa Rosa, CA 95401; Mike, (707) 571-1700



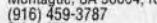
**Just for Fun R/C Raceway**, 509 S. State St., Ukiah, CA 95482; Don, (707) 462-7305 days



**K&M R/C Raceway**, 22474 A Barton Rd., Grand Terrace, CA 92324; Mike Blake, (714) 783-0899



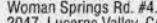
**KW Raceway**, 5630 Ager Rd., Montague, CA 96064; Keith Wilson, (916) 459-3787



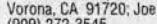
**Lodi's Radio Control Speedway**, 1033 Black Diamond, Ste. B, Lodi, CA 95240; Mike Belanger, (209) 334-5681



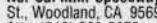
**Lucerne Valley Raceway**, 32800 Old Woman Springs Rd., #4, P.O. Box 2047, Lucerne Valley, CA 92356; Frank Rodriguez, (619) 248-7305



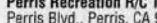
**M n M Hobbies**, 137 N. Vander, Vorona, CA 91720; Joe Stanovich, (909) 272-3545



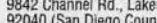
**Nor-Cal Mini-Speedway**, 519 Bush St., Woodland, CA 95695; Steve Van Atta, (916) 668-5678



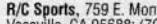
**Perris Recreation R/C Track**, 120 N. Perris Blvd., Perris, CA 92370; (909) 943-6603



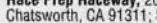
**R/C Racing Center and Hobbies**, 9842 Channel Rd., Lakeside, CA 92040 (San Diego County); Russ or Cindy Escalera, (619) 443-2270



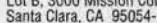
**R/C Sports**, 759 E. Monte Vista Ave., Vacaville, CA 95588; (707) 446-5555



**Race Prep Raceway**, 20115 Nordhoff, Chatsworth, CA 91311; Steve Dunn, (818) 709-6800



**Rams 1/8-scale Gas**, Mission College, Lot B, 3000 Mission College Blvd., Santa Clara, CA 95054-1897; Ken Kimbrow, (408) 238-2089



**Ranch Pit Shop**, 1655 E. Mission Blvd., Pomona, CA 91766; Ken Shintani, (909) 623-1506



**RCR Hobbies**, 2069 Pacific Coast Hwy., Lomita, CA 90717; Rhea & Cliff Fisher, (310) 530-7272



**Revelation Raceway**, 4871 State St., Montclair, CA 91762; Tim Bump, (909) 464-8247



**NERCAR**, 36 Glendale Rd., Enfield, CT 06082; Phil Olsson, (203) 627-5410



**Little Bristol Speedway**, 302 Rt. 39, New Fairfield, CT 06776; Dale Cote, (203) 355-4028



**NERCAR**, 36 Glendale Rd., Enfield, CT 06082; Phil Olsson, (203) 627-5410



**Pro Hobbies Speedway**, 715 N. Lake Pleasant Rd., Apopka, FL 33341; Doug Gleason, (407) 743-9791 or Tim Case (407) 627-2608



**Red's R/C Raceway & Hobbies, Etc.**, 1010 Creighton Rd., Pensacola, FL 32504; Linda Till, (904) 479-2330



**River City R/C Car Club**, 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



**Sarasota Flat Track**, 4900 Fruitville Rd., Sarasota, FL 34232; Jim Wilson, (941) 371-3689



**Terryville Hobby**, 153 S. Riverside Ave., Pequabuck, CT 06781; Harry or Ray, (203) 584-5562



### DELAWARE

**Hobby Stop Speedway**, RD4, Box 100, Rte. 13, Seaford, DE 19973; Remy Haynes, Jr., (302) 629-3944

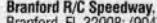


### FLORIDA

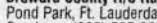
**B+T R/C Central**, 811 Playground Rd., Ft. Walton Beach, FL 32547; (904) 863-1666



**Branford R/C Speedway**, Rt. 3, Box 240, Branford, FL 32008; (904) 935-0758



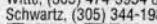
**Broward County R/C Race Club**, Mills Pond Park, Ft. Lauderdale, FL; Ed Octobero, (305) 525-3304



**Challenger Speedway at the Willows**, Willows Park & Okeechobee Blvd., Royal Palm Beach, FL 33414; Walt (407) 965-2790; (407) 790-6917



**Coral Springs Roadrunners**, P.O. Box 9632, Coral Springs, FL 33077; Randy Witte, (305) 473-5934 or Rick Schwartz, (305) 344-1983



**First Coast Speedway**, 6410 W. Walther Dr., Jacksonville, FL 32211; Bob Thompson, (904) 743-2161



**5-Fifty-5 R/C Raceway**, State Road 555, Bartow, FL 33830; Chuck Nolke, (813) 324-7406



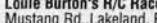
**Greater Orlando Auto Racers**, 970 Keller Rd., Altamonte Springs, FL 32714; Dave Mottin, (407) 263-4819



**Hudson's R/C Raceway**, 590 Madeoreo St., St. Octobrerie, FL 32095; Steve Hudson, (904) 826-4050



**Hobby World Raceway**, 7273 103rd St., Jacksonville, FL; Ray or Greg, (904) 772-9022



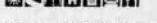
**Louie Burton's R/C Raceway**, 4215 Mustang Rd., Lakeland, FL 33803; Louie Burton, (813) 665-1322



**Miami R/C Raceway**, 12546 S.W. 88 St., Miami, FL 33101



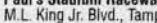
**Morris Kohl's Raceway and Hobby Shop**, 1202 W. Waters Ave., Tampa, FL 33604; Morris Kohl, (813) 931-1626



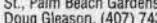
**My Rose**, 1695 W. Indianland Rd., Jupiter, FL 33458; Mark Watson, (407) 744-3800



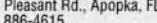
**NORRA**, 3300 Santa Barbara Blvd., Naples, FL 33999; Jerry Pecar, (941) 455-9065 or Mark Benfield, (941) 263-6861



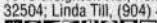
**Ocala Radio Control Car Club**, 3500 SE 30th Terrace, Ocala, FL 34471; Steve Shook, (904) 694-5147



**Paul's Stadium Raceway**, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662



**PBG R/C Motor Park**, 6351 Barbara St., Palm Beach Gardens, FL 33418; Doug Gleason, (407) 743-9791 or Tim Case (407) 627-2608



**Pro Hobbies Speedway**, 715 N. Lake Pleasant Rd., Apopka, FL 33341; Doug Gleason, (407) 479-2330



**Red's R/C Raceway & Hobbies, Etc.**, 1010 Creighton Rd., Pensacola, FL 32504; Linda Till, (904) 479-2330



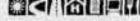
**River City R/C Car Club**, 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



**Sarasota Flat Track**, 4900 Fruitville Rd., Sarasota, FL 34232; Jim Wilson, (941) 371-3689



**Southwest Florida R/C Raceway,**  
2425 Rivers Rd., Naples, FL 33964;  
Clyde Armstrong, (813) 455-1143



**Superior Hobbies R/C Parking Lot**  
**Racing**, 430 E. Hwy. 436, Suite #106,  
Casselberry, FL 33707; Robbie  
Michael, (407) 834-9299



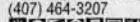
**Tampa Bay R/C Club**, P.O. Box 10224,  
St. Petersburg, FL 33733; Dick  
Gillette, (813) 526-0744



**Three Flags R/C Racetrack**, 1755  
East S.R. 44, Wildwood, FL 34785;  
Don Meares Sr., (904) 748-3870; fax  
(904) 748-5263



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



## GEORGIA

**Dalton Raceway**, 2300 Chattanooga  
Rd., Dalton, GA 30720; (404) 226-6699



**Dry Branch Raceway**, 3751 Gail Dr.,  
Dry Branch, GA 31020; David  
Stomper, (912) 477-0139; Brandon  
Mercer, (912) 746-7519



**Echelonne Super Speedway**, 2149  
Richardson Dr., Macon, GA 31206; Andy  
Thompson/Cliff Kline, (912) 788-8731



**Lake Mayer Raceway**, 1430 Dale Dr.,  
Savannah, GA 31406; Pat Rossiter,  
(912) 354-0098



**The Racer's Edge**, 1530 Hwy. 19 N.,  
Thomaston, GA 30286; Roger or Mark  
Walls, (706) 648-2637



**Ronnie's Hobbies**, 17050 Jimmy  
Carter Blvd., Norcross, GA 30092;  
Gregg Mundkowsky, (404) 246-0808



**Sandy Cross Speedway**, Rt. 1, Box  
1071, Hwy 51, Royston, GA 30662;  
Morris Phillips or Wayne Fowler, (706)  
245-9573



**SHILOH R/C Raceway**, 6362 Shiloh  
Rd., Hahira, GA 31632; Doug Burnett,  
(912) 794-2507



**Silver Wings Raceway**, 5611  
Riverdale Rd., College Park, GA  
30349; M. Bradshaw, (404) 991-2225



**Sugar Bowl R/C Speedway**, 5272  
Nelson Brodton Blvd., Sugar Hill, GA  
30518; Shelly Bailey, (770) 945-6709



## KEY TO SYMBOLS



Indoor



Outdoor



Off-road



Oval



Dirt oval



Carpet



Concrete



Asphalt



On-site hobby shop



AC power



Auto lap-counting

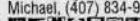


Food available

**Valdosta Hobbies**, 950 N. St.  
Octoberine, Valdosta, GA 31601; Ron  
Hood, (912) 244-2101



**Superior Hobbies R/C Parking Lot**  
**Racing**, 430 E. Hwy. 436, Suite #106,  
Casselberry, FL 33707; Robbie  
Michael, (407) 834-9299



**Tampa Bay R/C Club**, P.O. Box 10224,  
St. Petersburg, FL 33733; Dick  
Gillette, (813) 526-0744



**Three Flags R/C Racetrack**, 1755  
East S.R. 44, Wildwood, FL 34785;  
Don Meares Sr., (904) 748-3870; fax  
(904) 748-5263



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448

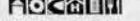


## HAWAII

**Garden Isle R/C Racers**, 5855 Ahakea  
St., Kapaa Kauai, HI 96746; Arnold  
Morales, (808) 823-0856



**Maui R/C Racing Association**, 430  
Honokai St., #13, Wailuku, HI 96793;  
Tritech R/C Hobbies, (808) 244-0526

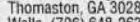


**Radio Control Hawaii**, 474 Kalanikoa  
St., S-104, Hilo, HI 96720; Glenn  
Shirama, (808) 935-5629

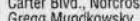


## IDAHO

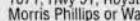
**Capital Dirt Burners**, 1200 S. Artesian  
#12, Eagle, ID 83616; Brian Fulkerson,  
(208) 939-4816



**River City Bandits**, 4867 N.  
Yellowstone, Idaho Falls, ID; Chris  
Hummer, (208) 523-9846



**Snake River R/C Raceway**, 265  
Highway 50, Hansen, ID 83334; Jim  
Tattersall, (208) 423-5122



## ILLINOIS

**Ameri-Trac**, RR 3, Box 242, Mattoon, IL  
61938; Ben or Judy Giles, (217) 235-  
6873



**AJ's Raceway & Hobby**, 10211  
Keslinger Road, Dekalb, IL 60115; A.J.  
Schultz, (815) 756-2772



**BARR**, 809 River Dr., Byron, IL 61010;  
Jim Haynes, (815) 234-5615



**B.G. R/C Racing & Hobbies**, 56 E.  
Ferguson, Wood River, IL 62095; Ben  
or Judy Giles, (618) 254-6301



**C&R Hobbies**, 39 E. Jones, Milford, IL  
60593; Ray Craighead, (815) 889-4073



**Cedarville R/C Speedway**, 430 W.  
Washington, Cedarville, IL 61013; Troy  
Poko, (815) 745-2885



**Diehard R/C Raceway**, 300 N. Main,  
Kewanee, IL 61443; Dick Jennings,  
(309) 852-3700



**Hobby Town Raceway**, 4611 W. Rt.  
120, McHenry, IL 60050; Mike  
Hollingsworth, (815) 344-1777



**Leisure Hours R/C Raceway**, 24121 W.  
Theodore, Bldg. 1, Plainfield, IL 60544;  
Scott Hill, (815) 439-1777 (track),  
(815) 439-1477 (shop)



**Machesney Park**, 1220 Shappert Dr.,  
Machesney Park, IL 61115; (815) 282-  
1311



**Marty's R/C Hobby**, 1335 E. Broadway,  
Bradley, IL 60915; Gail or Marty, (815)  
933-8441



**Mitey Motor Speedway**, 1109 N.  
Bloomington St., Rte. 23, Streator, IL  
61364; Doug, (815) 672-4212



**Monee R/C Raceway**, 26049 Ridgeland  
Ave., Monee, IL 60449; Roy or Roberta  
Moody, (708) 534-2422 (track), (708)  
799-5597



**Pontoon Raceway**, 3670 St. Route 111,  
Granite City, IL 62040-4304; Pat or  
Skip, (314) 691-3824, (618) 931-1206



**R/C Workshop**, 3100 S.W. Adams St.,  
Peoria, IL 61605; Al Kretz, (309) 673-  
4860



**Radio-Active Raceway**, 751 N.  
Bolingbrook Dr., #15, Bolingbrook, IL  
60440; Jim, (630) 759-7557



**Shiok Eagles Superspeedway**, 308 N.  
Virginia Ave., Belleville, IL 62220; (618)  
277-6030



**Sugar Bowl R/C Speedway**, 5272  
Nelson Brodton Blvd., Sugar Hill, GA  
30518; Shelly Bailey, (770) 945-6709



**Valdosta Hobbies**, 950 N. St.  
Octoberine, Valdosta, GA 31601; Ron  
Hood, (912) 244-2101



**Superior Hobbies R/C Parking Lot**  
**Racing**, 430 E. Hwy. 436, Suite #106,  
Casselberry, FL 33707; Robbie  
Michael, (407) 834-9299



**Tampa Bay R/C Club**, P.O. Box 10224,  
St. Petersburg, FL 33733; Dick  
Gillette, (813) 526-0744



**Three Flags R/C Racetrack**, 1755  
East S.R. 44, Wildwood, FL 34785;  
Don Meares Sr., (904) 748-3870; fax  
(904) 748-5263



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 385-4448



**Treasure Coast R/C Club**, 4931  
Oleander, Fort Pierce, FL 34982; Lou,  
(407) 464-3207



**West Coast R/C Club**, Lake Park,  
17203 N. Dale Mabry, Tampa, FL  
33549; Alex, (813) 920-7448; Bert,  
(813) 654-2554



**Winterset Raceway**, US Rt. 27 South,  
Winterset Motel, Sebring, FL 33872;  
John Bisbee or Max Mixe, (941) 699-  
1140 or (941) 3

# PRO-LINE TRACK DIRECTORY

**R&L Hobbies & Racing**, 9782 Portage Rd., Portage, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744  


**Rainbow Gardens**, 600 North Shore Ave., Crystal, MI 48818; Mike or Sandy, (517) 235-4298  


**USA Raceways**, 6083 Dixie Hwy., Bridgeport, MI 48722; Dave Killingsworth, (517) 777-7000  

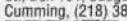

**Vicksburg Off-Road R/C Raceway**, 50201 Silver St., Vicksburg, MI 49097; Jeff Schroeder, (616) 375-8591  


**Village Hobbies-n-Crafts**, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374  


**W.A.R.R.**, 1025 Gilmore Ave., Winona, MI 55987; Patrick Smith, (507) 452-6732  


**Westside R/C Raceway**, 4335 Lake Michigan Dr., Grand Rapids, MI 49504; George Orlikowski, (616) 791-9002. (Open October through October)  


## MINNESOTA

**Badger R/C Raceway**, 404 Tamarack St., Box 101, Badger, MN 56714; Keith Cumming, (218) 386-2001  


**Duey's Hobbies & R/C Raceway**, 6600 Cahill Ave., Inver Grove Heights, MN 55076; Duey Carlson, (612) 450-1721  


**Grand Rapids R/C Speedway**, 2209 Hwy 2 East, Grand Rapids, MN 55744; Aaron Voges, (218) 326-6751  


**Greater Minnesota Racin' Place**, 3302 Southway Dr., St. Cloud, MN 56301; Jon Jackson, (612) 252-9768  


**Hyperseed Indoor**, 410 2nd St. NE, Milaca, MN 56353; Randy Reiman, (612) 983-6329  

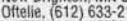

**Larry's Raceway Park**, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (612) 634-5246  

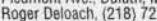

**Minn-E-Golf & Hobby**, 9100 Park Ave., Elk River, MN 55330; (612) 441-8365  


**Paul Bunyan Raceway**, Rte. 1, Box 468, Bemidji, MN 56664; Brad Trask, (218) 243-2749  

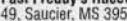

**R/C Racing World**, 235 Main Ave. North, Harmony, MN 55939; Mark McKay, (507) 886-5931 or (507) 886-2224  


**Southside Speedway**, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233  

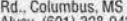

**Trackside Racing**, 443 8th Ave. NW, New Brighton, MN 55112; Winton Oftelie, (612) 633-2112  


**Wild West R/C Speedway**, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248  


## MISSISSIPPI

**Fast Freddy's Raceway**, 20390 Hwy. 49, Saucier, MS 39574; Mark Payne, (601) 832-0315  


**Joe McFaden Hobbies**, 1619 51st Ave., Meridian, MS 39307; Joe McFaden, (601) 483-7000  

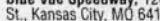

**Rural Hill Raceway**, 2535 Tabernacle Rd., Columbus, MS 39702; Jeffrey Alvey, (601) 328-9429  


**Small Cars Unlimited**, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST  


## MISSOURI

**All Seasons Hobby**, 152 O'Fallon Plaza, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767  


**B&L Hobbies & Raceway**, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (314) 431-9444  


**Blue Eye Speedway**, 12019 E. 47th St., Kansas City, MO 64133; Mark Randal, (816) 358-0238  


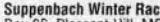
**Columbia R/C Trax**, 1502 W. Bus Loop 70 (Exit 125), Columbia, MO 65202; Gary Phillippe, (314) 682-3993  


**Greentree R/C Racepark**, St. Louis Dirt Burners R/C Club, Marshall Rd., Kirkwood, MO; (314) 831-2194  

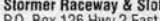

**Hobbies 'n Stuff Raceway**, 102 West Pearce Blvd., Wentzville, MO; Tim Satchwill, (314) 327-6006  

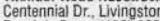

**Mid-Mo R/C Raceway**, 400 W. 2nd., Sedalia, MO 65301; (816) 826-5113  


**Ozarks R/C Raceway**, Hwy 13, Brighton, MO 65781; Gene Rhodes or Ron Hawkins, (417) 742-4376 or (417) 742-2561  

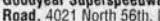

**Suppenbach Winter Racing**, Route 5, Box 66, Pleasant Hill, MO 64080; Larry Suppenbach, (816) 987-5828  


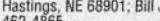
## MONTANA

**Stormer Raceway & Slot Motorplex**, P.O. Box 126 Hwy 2 East, Glasgow, MT 59230; (406) 228-4569  


**Thunder Road Racetrack**, 110-E Centennial Dr., Livingston, MT 59047; Dominic Papa, (406) 223-1352  


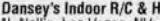
## NEBRASKA

**Goodyear Superspeedway and Off-Road**, 4021 North 56th, Lincoln, NE 68510; Tom or Bob, (402) 464-5000  


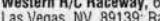
**Mr. Bill's**, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4865  


**Wild Card Raceway**, RR 1 Box 137, Columbus, NE 68601; Roger F. Miller, (402) 564-7743  

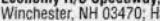

## NEVADA

**Dansey's Indoor R/C & Hobbies**, 741 N. Nellis, Las Vegas, NV; David Lugo, (702) 453-RACE  


**Silverbowl Speedway**, 7274 Hardtack Cir., Las Vegas, NV 89119; Mike, (702) 896-3577  

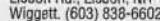

**Western R/C Raceway**, 6404 Richmar, Las Vegas, NV 89139; Randy Grigg, (702) 897-7227  


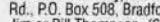
## NEW HAMPSHIRE

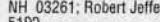
**Economy R/C Speedway**, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470  


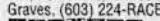
**Fastracker Club**, 520 Washington St., Keene, NH 03431; Bill Phillips or John O'Connor, (603) 357-8393  


**Hobby Etc.**, Heritage Place, Rt. 101A, Amherst, NH 03031; (603) 595-8549  

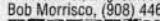

**Open Season Sports Center**, Rt. 302, Lisbon Rd., Lisbon, NH 03585; Joseph Wiggett, (603) 838-6602  


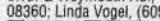
**Outback Raceway**, East Washington Rd., P.O. Box 508, Bradford, NH 03221; Jim or Bill Thompson, (603) 938-2425  


**Robert's Railroad and Hobbies**, 320 1st NH Turnpike, Rte. 4, Northwood, NH 03261; Robert Jeffers, (603) 942-5192  


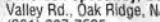
**RT 106 Racepark**, 743 Clough Mill Rd., Pembroke, NH 03275; Douglas Graves, (603) 224-RACE  


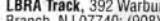
## NEW JERSEY

**Bob's American Raceway**, 142 Wilson Ave., Englewood, NJ 07626; Bob Morrisso, (908) 446-3737  


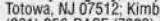
**Family Hobbies Raceway**, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790  


**Golden Hobbies Raceway**, 415 Erial Rd., Pine Hill, NJ 08201; John or Iona Golden, (609) 782-1222  

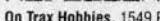

**Jefferson Speedway**, 5494 Berkshire Valley Rd., Oak Ridge, NJ 07438; (201) 697-7525  


**LRA Track**, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122  


**Millville R/C Oval**, 114 N. High St., Millville, NJ 08332; William Denstoz, (609) 327-4640  


**Pit Stop Dragway**, Campus Rd., Tottowa, NJ 07512; Kimberly Frank, (201) 956-RACE (7223)  


**The Race Place**, 1151 Hwy. 33, Farmington, NJ 07731; John Fary, (908) 938-5215  


**On Trax Hobbies**, 1549 Rte. 70, Brown Mills, NJ 08015; Joseph DiGirolamo, (609) 735-0422  


**Zeppelin Hobbies**, 92 Rt. 23N, Riverdale, NJ 07457; Lou Ballini, (201) 831-7717  

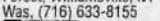

## NEW MEXICO

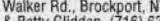
**Meerscheidt R/C Raceway Park**, Walnuth and Hadley, Meerscheidt Park, Las Cruces, NM 88001; Wayne Ward, 2230 Coleen Ct., (505) 523-4863, (505) 526-1758  


**R/C Sport Hobby**, 69-57 Juniper Blvd., South, Middle Village, NY 11379  


**R&S Hobbies**, 356 Macedon Ct. Rd., Fairport, NY 14502; (716) 425-3722  


**Rampage R/C**, 27 Fuller Ln., Hyde Park, NY; Brian Walker, (914) 229-2456  


**Ringwood Junction**, 1922 Dryden Rd., Freeville, NY 13068; Steve Miller, (607) 347-4198  


**Schoharie Co. R/C Car Club**, P.O. Box 126, Cobleskill, NY 12043; (518) 234-4600  


**Small Torque Racers of Long Island**, 13 Melony Ave., Plainview, NY 11803; Thomas Bolger, (516) 938-9005  

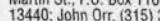

**Southerter Raceway**, 88 Paige St., Owego, NY 13827; Anita Harding, (607) 687-5395  

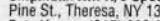

**South Shore Hobby & Raceway**, W. Roe Blvd., Patchogue, NY 11772; Don Hauck, (516) 758-5567  

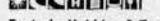

**Speedworld R/C & Hobby**, P.O. Box 482, Chenango Bridge, NY 13745; Michael Magnusson, (607) 648-2063  


**Tri County Remote Control Car Club**, 33 West Decker St., Johnston, NY 12095; Jim Sprouse, (518) 762-8884  

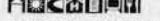

**Ulster County Speedway**, P.O. Box 71, New Paltz, NY 12561; Joe Colombo Jr., (914) 754-7664  


**Central New York R/C Auto Racers**, Martin St., P.O. Box 116, Rome, NY 13401; John Orr, (315) 336-5140  


**Chipmunk Hill R/C Speedway**, 217 Pine St., Theresa, NY 13691; Ted or Pete House, (315) 628-5065  


**Fastraks Hobbies & Trophies**, 90 Sharron Ave., Plattsburgh, NY 12901; Joanne Sears, (518) 562-1200  


**Hai's Hobby Shop**, 120 Cayuga St., Fulton, NY 13069; Hal & April Halstead, (315) 598-2772  

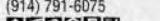

**Hobby Images R/C Raceway**, 89 Jerusalem Ave., Hicksville, NY 11801; Chris LaRussa, (516) 822-8259  


**Jerry's Raceway**, 111 S. Applegate Rd., Ithaca, NY 14850; Jerry and Lori Achilles, (607) 277-0940  

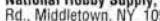

**Li 1/4-Scale Racers**, 63 Harton Dr., Huntington Station, NY 11746; (516) 515-5384  


**Long Island Raceway**, 168 Broad Hollow, Farmingdale, NY 11735; Jane, (516) 845-7223  


**The Model Shop**, 1 Lakewood Ave., Monticello, NY 12701; Richard Cimino, (914) 791-6075  

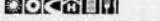

**Mountain Raceway**, 200 P.O. Box 120, Aberdeen, NC 28315; Steve and Debbie Williams, (910) 625-1000  


**National Hobby Supply**, 25½ Webb Rd., Middletown, NY 10940; Bruce Roosa, (914) 342-6786  


**N.Y. R/C Raceway**, 300 W. 55th St., New York, NY 10019; Jack Zelner, (212) 956-7296  


**Performance Plus Radio Control Speedway/The Hobby House**, 1141 ½ Jones & Gifford Ave., Jamestown, NY 14701; (716) 488-1772  


**P.R.O. Speedway**, 5 Washington St., Cattaraugus, NY 14719; Marc Pritchard, (716) 257-3101  

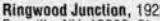

**R/C Hobbies**, Rt. 49, Box 138, Constantia, NY 13044; Roy Catholdi, (315) 623-8565  


**R/C Sport Hobby**, 69-57 Juniper Blvd., South, Middle Village, NY 11379  


**King R/C**, P.O. Box 897, Five Forks Village, King, NC 27021; Chris Smith, (910) 983-3969  


**King Super Speedway**, 143 Industrial Dr., P.O. Box 897, King, NC 27021; Chris Smith, (910) 983-5598 or (910) 883-3969  


**Mine Hole Gap R/C Raceway**, 1297 Charlotte Hwy., Ashville, NC 28730; Steve Shultz, (704) 628-3020  


**Ride & Slide R/C Raceway**, 5319 Yadkin, Fayetteville, NC 28303; Jim Woodman (910) 425-5276 or Bill Culbertson (910) 867-4202  


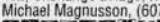
**R&J Off-Road Racing**, 6172 Blalock Rd., Lumberton, NC 28351; Robert Williams, (910) 239-0839 or Jonathan Jenkins, (919) 746-2703  


**R.J.S. R/C Parkway**, Rt. 9, Box 651, John B. Carter Rd., Fayetteville, NC 28301; Tony Starling, (910) 486-4820  


**Rosewood R/C Speedway**, 651 Community Dr., Goldsboro, NC 27530; Glenn Elam, (919) 731-4734  


**S&B Sportswear & Hobbies**, Rt. 1, Box 311, Farmville, NC 27828; Ricky Strickland, (919) 753-4422  

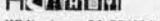

**Sandhills Raceway Inc.**, US #1 South, Aberdeen, NC 28315; (919) 944-7414  


**Ultradix**, 5505 Palmers Branch, Leland, NC 28421; Mike Williams, (910) 313-0350  


**Walt's Hobby**, 2 Dwight Park Dr., Syracuse, NY 13209; (315) 455-2291  


**Westfield R.C. Speedway**, 27 Clark St., Westfield, NY 14787; John or Jared Lindstrom, (716) 326-2339  


**Whistone**, 30-56 Whistone Expy., (Dept. of Motor Vehicles), Flushing, NY 11374; Rudolf Ardilla, (718) 966-6155  


**ZOAR Road Speedway**, 15138 Armies Ct., Gowanda, NY 14070; David & Gordon Ackler, (716) 532-9463  


RACING TO BRING YOU THE BEST!

PROTOform®

## The Streak Continues

With the summer racing season going strong, we at Protoform are excited about the winning streak that we've had so far in 1996. With Mark Pavidis dominating qualifying and Joel Johnson and Masami Hirooka dominating the A-Main at Revelation Raceway's Warm-Up race for the IFMAR 1/10- and 1/12-scale Worlds, it looks as if our chances of keeping our streak going are pretty good. We've got a new "weapon," too—the Peugeot 905B on-road bodies that are molded after the cars that

dominated the Group C Series and the 24 Hours of Le Mans. We hope that racers who use it will carry on the winning tradition that our Nissan P-35 has enjoyed. This ultra-racy-looking body is available in three versions:

high downforce—#1407H;  
medium downforce—#1407M;  
and low downforce—#1407L.

This should help you racers tune for almost any track condition. The most impressive winning streak established by a body (possibly ever!) is that of the PROTOform 1996 T-Bird HS #1210R. It has been used to win two or more A-Mains at every major Velodrome race (NORRCA and CIRCAR) for the last 11 months!

At NORRCA's June Domingus Hills Velodrome event, PROTOform was the choice of all the "fast guys." Larry Pipp won the Supertruck Main with the #1511 Chevy. Brian Blaser continued his domination of the Stock class with another win, and Danny Egger was the Enduro champ. During qualify for the Enduro class, PROTOform test driver Bill McAneney took 10 full seconds off his own track record. Perennial West Coast "rocket" Gary Hamilton made the switch to the PROTOform T-Bird after working in the Aero Labs wind tunnel. Gary not only dominated qualifying but he also made the

because they were just *flat-out fast!* When Qualifying had ended, Bill Impson was TQ in both Stock and Modified. He then went on to win the stock A-Main with unheard of lap times. Iowa racer Mike Ryan drove his T-Bird-body SRP Spectre to the Modified A-Main win, and Kevin Trent absolutely ran off and hid in the Enduro. Kevin drove a nearly perfect race to bring his T-Bird home 28 laps ahead of his nearest challenger!

The 1996 ROAR Paved Oval Nationals was hosted by Wisconsin's beautiful Tri-Clone Raceway. Once again, racers using PROTOform race bodies ended up on the podium. A big congratulations to you, Kirby Hand—the new ROAR 1/10-scale Modified Champion—for taking your biggest win to date. In 1/10-scale Stock, Rick Talbot was invincible: he not only qualified as number one, but he also won the A-Main. Both Kirby and Rick used the #1209L Monte Carlo body. In the four A-Mains, PROTOform stock-car bodies covered more cars than all other brands combined.

## New &amp; Hot Protoform Body Styles!

1303 1996 Monte Carlo (wide version)—regular (.040) and lite (.030.)  
 1406\* 1996 Benz C-Class ITC (DTM) with two wing sizes.  
 1407H Peugeot 905B (wide), high downforce, regular weight (.030).  
 1407M Peugeot 905B (wide), medium downforce, regular weight (.030).  
 1407L Peugeot 905B (wide), low downforce, regular weight (.030); add L to part no. for lightweight (.025) Peugeot 905B.  
 1408\* 1996 Audi A4 BTCC touring car with two wing sizes.  
 1512 1997 Ram off-road truck for RC10GT (fits new, wider, rear shock towers).  
 \*fits Tamiya, Yokomo YR-4 and HPI RS4 (narrow)

## Racing to Bring You the Best!

RACING TO BRING YOU THE BEST!



Protoform 1995 Saturn SC2 Coupe #1405

## NORTH DAKOTA

Hacienda Hills Speedway, 20 Hacienda Hills, Minot, ND 58701; Kenny Duchscherer, (701) 839-4419

Northern Mini Racers, P.O. Box 415, Minot, ND 58702; Roger Lee, (701) 839-5294

Surrey International Raceway, RR 1, Box 37, Norwich, ND 58768; Marlen Lenton, (701) 728-6760

Valley Hobbies Inc., 2714 Main Ave., Fargo, ND 58103; Marshall Skare, (800) 493-9971

OHIO

Aerotech Raceway, 409 Apple Grove Rd., North Canton, OH 44720; (216) 499-1300

Classic Hobbies, 1994 E. Waterloo Rd., Akron, OH 44312; Walt Ellis, (216) 733-6400

C/R Hobbies and Raceway, 323 Center St., Ashtabula, OH 44004; Virginia Gagat, (216) 992-3833

CORCAR/Sams Club, 128 Amity Rd., Galloway, OH 43119-8732; Bill Stevenson, (614) 870-7159

D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667; Don Yoder or Mark Nussbaum, (216) 682-4266

D&S Hobbies Raceway, 7701 Crile Rd., Concord, OH 44077; (216) 354-2112

Flag City Raceway, 3772 C.R. 18, Findlay, OH 45340; Ruth Hubbard, (419) 422-5589

Hobby World, 940 E. Main St., Ravenna, OH 44266; Thomasor Jeremy, (330) 296-0894

JB Hobby & Raceway, 8760 St. Rt. 201, Tipp City, OH 45371; Bob Curtis, (513) 845-8222

Kent Hobby, 832 N. Mantua St., Kent, OH 44240; Bob Sabo, (216) 673-0422

Lafferty R/C Raceway, Box 153, 70228 Hurrah St., Lafferty, OH 43951; Chris Christman, (614) 968-4818

Lake Hobbies, 3425 Manchester Rd., Akron, OH 44314; Roy Spencer, (330) 645-6912

Medina R/C Raceway, 754 N. Court St., Medina, OH 44256; Bill Aholt, (216) 723-0255

Mid American Raceway, 13150 Airport Hwy., Swanton, OH 43558; Bill or Chuck, (419) 475-9459

Mr. T's R/C Super Speedway, 5540 CR 16, Wauseon, OH 43567; Nick Tinster, (419) 335-3196

Performance R/C Club of Ohio, 2206 13th St. NE, Canton, OH 44705; Greg Ledbetter, (216) 453-7089

Scooter's Hobby Hut, 234 Robbins Ave. #D, Niles, OH 44446; Dave "Scooter" Evans, (216) 544-9411

Steel Valley Hobbies & Raceway, 157 N. 4th St., Steubenville, OH 43952; William Northrop, (614) 282-3003

Van Wert R/C Raceway, 112 W. Main St. (above Tom's Donuts), Van Wert, OH 45891; Charlie Hite, (419) 238-4917

Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701; Kevin McKenna, (614) 455-3025

## OKLAHOMA

Adams Creek R/C Speedway, 5207 S. 194th E. Ave., Broken Arrow, OK 74014; John Beighle, (918) 355-1416

Competition R/C, 180 SE 89th, Oklahoma City, OK 73149; James or Louise Brown, (405) 634-0809

Coweta Hobby & Speedway, 310 S. Broadway, Coweta, OK 74429; Derrial Seabolt, (918) 486-3948

Off-Road Car Assoc. of Tulsa, 9720 Swan Dr., Broken Arrow, OK 74014; George Gooch, (918) 486-4528

Remote Control Race Course, 400 S. Vermont Ave., Suite 104, Oklahoma City, OK 73108; Rick or Steve, (405) 947-RACE

Wild Country Speedway, 127 South Main, Porter, OK 74454; Charles McCollough, (918) 685-0372 or (918) 687-1686

## OREGON

Competition Racing Assoc., 17941 NE Glisan, Portland, OR 97230; Mark Taylor, (503) 761-1334

Junior Vehicle Speedways, 3090 Starwood Ct., Medford, OR 97501; (503) 779-3090

Pit Stop Hobby, 634 N. Coast Hwy., Newport, OR 97365; Richard Wood, (503) 265-2825

R/C Plus Hobbies Raceway, 2029 25th St. SE, Salem, OR 97302-1130; Ron Smith, (503) 364-9188

R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; (503) 779-8298

Yamhill County R/C Car Club, 722 Morgan Ln., McMinnville, OR 97128; Larry Rucker, (503) 472-7234

## PENNSYLVANIA

A&D's Bumps & Jumps, RR7, Box 7395C, Stroudsburg, PA 18360; Dan Ambrosio, (717) 424-1750

Bachman's Speedway & Hobbies, Box 306, Effort, PA 18330-0306; Jeffrey Bachman, (610) 681-5845

Benders Junction Speedway, 2300 Benders Dr., Bath, PA 18014; Gerald Wambold Jr., (610) 759-0161

Brookville Hobby Shop, 170 Main St., Brookville, PA 15825; Mark Tonell, (814) 849-7385

CEB Motors R/C Div., 5743 Molly Pitcher Hwy., Marion, PA 17235; Charlie Booze, (717) 375-4635

Clearfield R/C Car Club, P.O. Box 297, Clark Hill Rd., Hyde, PA 16843; Joe Welch, (814) 765-3045

Cressona Mall Speedway, Rt. 61, Pottsville, PA 17901; (717) 385-3506

DC Ultra Trax, 13 York Rd., Wycombe, PA 18974; David Cowan, (215) 672-5200

Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365; Louis Dussia, (814) 723-8052

East St. Raceway, 736 E. Railroad Ave., Verona, PA 15147; (412) 826-0602

Hobby America Raceway, 5 Fitzsimmons St., Duke Center, PA 16729; Dan or Mike Coast, (814) 966-3765

Hobby House Raceway, Downingtown Marketplace, Downingtown, PA 19335; J.T. Nelson, (610) 269-1300

RACING TO BRING YOU THE BEST!

RACING TO BRING YOU THE BEST!



## Update



Prior to the 1996-97 IFMAR On-Road Worlds, in both  $\frac{1}{10}$ - and  $\frac{1}{12}$ -scale, the Pro-Line/JACO team has logged many hours on the track and our tires appear to be the top choice for almost all the major teams. Their reason? Superior quality and consistency of the rubber combined with our lightweight, race-proven wheels. At the Worlds Warm-up Race at Revelation Raceway, all the  $\frac{1}{10}$ -scale A-Main drivers ran Pro-Line/JACO and eight out of 10  $\frac{1}{12}$ -scale A-Main drivers chose the superior traction of Pro-Line/JACO foam tires.

- **$\frac{1}{10}$ -scale winner**—Joel Johnson (Team Trinity): white rears (part no. 2144), Pink fronts (2124).
- **$\frac{1}{10}$ -scale Top qualifier (TQ)**—Mark Pavidis (Team Associated/Reedy)—Pink rears (2142), Pink fronts (2124).
- **$\frac{1}{12}$ -scale winner** and TQ—Masami Hirosaka (Team Yokomo/Associated/ Reedy)—Pink rears (2342), Purple fronts (2325).

Once again, Pro-Line/JACO is racing to bring you the best!

On another note, we feel it is time to confirm the rumors. Yes, Pro-Line/JACO is coming out with radial tires! Preliminary testing has been very encouraging with our new radial tires. In fact, we are so pleased with the results that we have considered releasing the tires at the end of the summer. However, we feel it is best not to rush these things, so no release date has been set. But they are coming!

### Helpful Hint #4

When you race outdoors—on a track or a parking lot—you should be prepared for changes in temperature, track conditions, etc. Unfortunately, to be totally prepared, you would need a few pairs of tires in every compound. Fortunately, there's now a tire that works well in almost every situation: Gold fronts (2122) and Gold rears (2141). Gold dot tires work especially well on dirty and dusty surfaces, such as parking lots and streets. So if you're having trouble with traction, try a set of Golds.

Good luck! See you in the winners' circle!

### RACING TO BRING YOU THE BEST!

P.O. Box 456, Beaumont, CA 92223;  
(909) 849-9781; fax (909) 849-2968

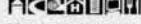
Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204;  
(412) 331-3866



Kranzel's R/C Raceway & Hobbies, 415-B Bosler Ave., Lemoyne, PA 17043; David or Stuart Kranzel, (717) 737-7223



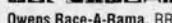
Lug Nut Raceway, Rt. 309 at Hartman Rd., Montgomeryville Mart, Montgomery, PA 18936; Kathy Anderson, (215) 542-8250



Marshall's R/C Raceway, RR 4, Box 640, Honesdale, PA 18431; Bill or Dot Marshall, (717) 729-7458



The Mushroom Bowl, 812 W. Cypress St., Kennett Square, PA 19348; Joe, Bruce, or Drew, (610) 444-1850



Owens Race-A-Rama, RR 2, Box 98 F, Hunlock Creek, PA 18621; Randy Owens, (717) 477-3220



Pinion Twisters, 3M Plant, Green Ln. and Mitchell, Bristol, PA; John (215) 632-9744; Bob (215) 945-0325



Pit Stop Hobbies, 262 W. Main St., Mount Joy, PA 17552; James Stoudt Jr., (717) 653-6222



Pro Challenge Raceways, Wycombe Ave. (P.O. Box 536), Lansdowne, PA 19050; Bob Paulavage and Don Fewkes, (610) 622-7651



Prop & Wheels Raceway, 139 W. Broad St., Tamaqua, PA 18252; Gil Walters, Prop & Wheels Hobbies, (717) 668-2288



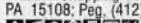
RCO Raceway 519 Broadway, Hanover, PA 17331; Chris Shaffer, (717) 633-9490



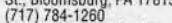
Riverside Raceway, PA Ave. W & Hickory, Warren, PA 16365; Jeff, (814) 723-4211



Rolling Wheels R/C Raceway, Westhill Shopping Center, Coraopolis, PA 15108; Peg, (412) 262-4858



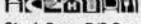
Road Runner Raceway, 1027 E. 7th St., Bloomsburg, PA 17815; John, (717) 784-1260



S.A. Hi Banks, Hahn's Dairy Rd., Palmerston, PA 18071; Scott Andrews, (610) 377-6123



Sinking Spring Race Center, 237 South Hull St., Sinking Spring, PA 19608; Randy Gelsinger, (610) 670-0760



Staub Bros. R/C Speedway, 31 Locust St., Gettysburg, PA 17325; Todd or Scott Staub, (717) 334-5445



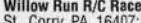
T-N-T Raceway, Randolph Rd., Great Bend, PA 18821; Ed Kraft, Rd. 1 Box 199C, Hallstead, PA 18821, (717) 967-2604 or Frenchie (607) 775-1756



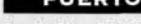
Wagonhill Hobbies, 967 New Castle Rd., Rt. 422, Butler, PA 16001; Jeff Hyatt, (412) 665-9877



Willow Mill Speedway, 37 N. Season's Dr., Dilksburg, PA 17019; George Verbowitz, (717) 432-4445



Willow Run R/C Raceway, 135 Wright St., Corry, PA 16407; Jim Small, (814) 664-8147



### PUERTO RICO

Dorado Offroad R/C Track, Pista Atletica Bo. Higuillar, Dorado, Puerto Rico 00646; Roberto Lamoso/Jaime Ramos, (809) 796-5603 or (809) 796-1734



Hacienda Muñoz R/C Track, Carr. #14, Juana Diaz, PR 00795, (809) 837-7083



### RHODE ISLAND

Rhode Runner Raceway, 20 State St., Bristol, RI 02809; Bill or Betsy, (401) 254-0409



SK Hobbies Inc., 15 Carl St., Johnston, RI 02919; Slim or Keith, (401) 453-1440



Tri-State R/C Raceway, 205 Hallene Rd., Warwick, RI 02886; Raymond Dean, (401) 738-4908



### SOUTH CAROLINA

Extrem R/C Raceway, 5976 Grace Lane, Myrtle Beach, SC 29577; Kevin Bullock, (803) 236-2083



Hobbies and More, 1570 S. Main St., Darlington, SC 29532; Jerry Pollard, (803) 393-0355



J&M R/C Hobbies, 5341 Dorchester Rd., Evanston Plaza, N. Charleston, SC 29418; Mike Smith, (803) 552-9449



### ORA Atomic Racing Facility

Boyd Pond Rd., Aiken, SC 29803; Bill Jackson, (706) 855-0846 or (803) 642-0314



Racer's Choice Remote Control, 4014 Fernandina Rd., Piney Grove Shopping Center, Columbia, SC 29212; Clifford McLinden, (803) 561-0000



The Great Escape, 105 Franklin Ave., Spartanburg, SC 29301; Jonathan Bowen, (803) 574-5273



World Hobbies, 707 Sulphur springs Rd., Greenville, SC 29611; Bob Pittman, (803) 246-4702 (Closed after 4:00 pm Mondays)



### SOUTH DAKOTA

Action R/C Raceway, 107 N. Main, Mitchell, SD 57301; (605) 996-6895

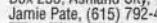


Dakota Off-Road Racers, 2989 W. Br. Co. 12, Aberdeen, SD 57401; (605) 226-0604

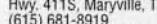


### TENNESSEE

Cumberland Valley Raceway, P.O. Box 233, Ashland City, TN 30715; Jamie Pate, (615) 792-4371, ext. 1195



D&M's Downtown Raceway, 2703 US Hwy 1 Hwy. 112, Maryville, TN 37303; (615) 681-8919



Lawson Raceway, 152 Joel Rd., Oliver Springs, TN 37840; Anthony Lawson, (615) 995-9351



Machine-Head Straits, 938 Grandmire Rd., Lawrenceburg, TN 38464; Larry and Eliane Sanders, (615) 762-6630



MSA R/C Racing, Rt. 12 Box 489 B, Crossville, TN 38555; D.R. Findley, (615) 456-0027



Robertson's R/C Raceway, 175 Seavers Rd., Jackson, TN 38301; Travis Robertson, (901) 424-6423



Sparta Raceway Park, 32 N. Main St., Sparta, TN 38583; Carl (Buddy) Elrod, Rt. 5 Box #652, Sparta, TN 38583, (615) 836-8450 or (615) 761-3407



Tri-County R/C Raceway, 919 Little Dogwood, 1312 Kingston Hwy., Kingston, TN 37763; Dwayne Romine, Kyle Romine, (615) 376-2330, 376-9955



AA Raceway, 1617 Foomey Rd., Austin, TX 78704; Wolf Gumpfory, (512) 474-8277



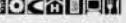
Big Mike's R/C Raceway, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604; (903) 297-7814



Eastex Raceway, 45000 Hwy. 59 N., New Caney, TX 77357; Tom Keller, (281) 399-9777



Flip & Spin R/C, 5957 Jones Rd., Bryan, TX 77807; Garland Crabb, (409) 822-7311



Hal's Hobby Raceway, 1440 Bessember, El Paso, TX 79936; (915) 591-2213



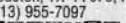
The Hobby Center Raceway, 14104 Stan Schleifer Loop, Suite 1, Killen, TX 76543; Lawrence Remick, (817) 690-7311



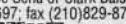
Hobbycraft Speedway, 819 N. Main St., Corsicana, TX 75110; Keith Hoffmann, (903) 872-6761



Hobbytown USA, 7516 FM 1960 W., Houston, TX 77070; Fred Pfaffman, (713) 955-7097



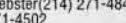
Hobbytown USA, 999 E. Basse Rd., Suite 177, San Antonio, TX 78209; Joe Sena or Carol Bairdson, (210) 829-8697; fax (210) 829-8707



Houston R/C Hobbies, 6338 Skyline Dr., Houston, TX 77057; Lynn Cramer, (713) 266-6000



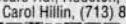
Indy R/C World, 220 Saturn Rd., Garland, TX 75041; Steve Webster (214) 271-4844; fax (214) 271-4502



Keyser's Hobbies, 1643 Texas, College Station, TX 77840; Bill Bennett (409) 893-8095



North Houston Speedway, 11847 Spears Rd., Houston, TX 77067; Bob or Carol Hillin, (713) 872-2471



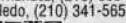
Performance Raceway, 1106C Witte Rd., Houston, TX 77055; Frosty Sinclear or Richard Oliver, (713) 464-4458



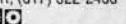
PlayIt R/C Raceway, 3518 W. Loop 306, P.O. Box 5245, San Angelo, TX 76902; Sammie Favre, (915) 942-6469



Rivercity Speedway, 11731 Wetmore, San Antonio, TX 78247; Ralph Hernandez, (210) 359-6870; Joe Toledo, (210) 341-5652



Rough Country, 905 Jacksboro Hwy., Wichita Falls, TX 76301-5310; Robert Kerr, (817) 322-2453



Star/Car Raceway, 5802 Patton St., Corpus Christi, TX 78415; Mike Hellums, (512) 289-0066; Race Hotline, (512) 881-6105.



KEY TO SYMBOLS



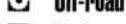
Indoor



Outdoor



Off-road



Oval



Dirt oval



Carpet



Concrete



Asphalt



On-site hobby shop



AC power



Auto lap-counting



Food available

# PRO-LINE TRACK DIRECTORY

**T&T Eagle**, 161 W. Spring Creek Pkwy., #601, Plano, TX 75023; Tony Welborn, (214) 517-0562

**Texas Speedway**, 6707 Chimney Rock, Bellaire, TX 77401

**T.O. Offroad Raceway**, 6236 Quail, El Paso, TX 79924; Efren Saenz, (915) 821-7522

**Wild Bill's Raceway**, 535 E. Shady Grove, Irving, TX 75060; Lynn Morgan or Jerry Williams, (214) 438-9224

## UTAH

**Fastrax**, 205 N. Carbon Ave., Price, UT 84501; Dave Johnson, (801) 637-6603

**Intermountain R/C Raceway**, 8481 W. 2700 S., Magna, UT 84044; David Mott, (801) 250-8303

**WOR Raceway**, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530

## VERMONT

**Bradford R/C Racing**, Main St., Bradford, VT 05033; Seth Bean, (802) 222-9674

**Stoughton Pond Raceway**, Stoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321

## VIRGINIA

**Bob's Hobbes & Raceway**, 910-J Brandy Creek Dr., Mechanicsville, VA 23111; Bob Wagner, (804) 746-2758

**Cooper's R/C Raceway**, Rt. 4, Box 918, SR635 Goblinlawn, Stuart, VA 24171; Pat Moon Jr., (540) 930-3984

**Fairystone R/C Speedway**, Rt. 4, Box 918, SR635 Goblinlawn, Stuart, VA 24171; Pat Moon Jr., (540) 930-3984

**Hoopy Hangers Speedway**, 4433 A, Brookfield Corp. Dr., Chantilly, VA 22201; Mark or Billy, (703) 631-8820

**The Hobby House**, 116 Edds Ln., Sterling, VA 20165; Ron Beckman, (703) 444-0333

**KC's Radio Control & Repair**, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596

**Olde Towne Hobby Shoppe**, 9105 Center St., Manassas, VA 22110; Arnie Levine, (703) 369-1197

**Roadmasters/Rick's Hobbies**, 12201 Balls Ford Ave., Manassas, VA 22110; Rick, (703) 330-6833

**Shamroc Raceway**, P.O. Box 3739, Winchester, VA 22601; Kevin Allen, (703) 662-0403

**Trackside Hobbies**, 1920 E. Pembroke Ave., Hampton, VA 23663; Rick Cardwell or Tom Gunther, (804) 723-4170

## WASHINGTON

**Allie's**, 108 South K St., Aberdeen, WA 98520; (206) 533-6638

**Burien Toyota R/C**, 15025 1st Ave. South, Seattle, WA 98148; Ray Meek, (800) 654-6456

**Four Season R/C Racing**, 2941 Sleater Kinney Rd. NE, Olympia, WA 98506; Gary & Sharon Brown, (360) 491-2430

**Hale's R/C Raceway Park**, 10611 136th St. E., Puyallup, WA 98374; Walt Hale, (206) 845-7675

**Home Town Hobby**, 116 N. Main Ave., Ridgefield, WA 98642; (206) 887-1769

**Jim's Wings & Wheels Raceway**, 1827 S. Washington, Kennewick, WA 99337; (509) 586-7420

**L&L R/C Raceway**, 15818 S.E. 287th, Kent, WA 98042; Bob Lewis, (206) 631-1664

**Raceway Hobbies**, 188 Sunset Ave. S., Edmonds, WA 98020; Brian Bodine, (206) 774-3285

**Rattlesnake R/C & Raceway**, 121 Big Pasco, Pasco, WA 99301; Bill Brandt, (509) 545-4495

**Schmidt's Auto Parts**, 10305 Old Hwy. 99, Marysville, WA 98271; Jon Failla, (206) 653-8338

**Spokane Indoor Raceway**, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Matson, (509) 534-RACE

**Tacoma R/C Raceway**, 6305 6th Ave., Tacoma, WA 98406; Scott Brown, (206) 565-1935

**Terror Raceway**, 8012 S. Tacoma Way, Tacoma, WA 98499; Dave Kleinman, (206) 584-8659

## WASHINGTON, D.C.

**Bolling AFB R/Car**, Bolling Air Force Base, Washington, D.C. 20332; Charles Leadbetter, (301) 843-7230 or Doug Balzer, (540) 338-3602

## WEST VIRGINIA

**Burr-Fab Raceway**, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487

**Fulton's R/C Raceway**, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355

**Left Turn Hobbies**, 100 Saco Ln. (by Post Office), Glen White, WV 25849; Stretch, (304) 255-3930

## WISCONSIN

**ABC R/C**, 244 W. Main St., Waukesha, WI 53186; Dick, (414) 542-1245

**Bayland Hobbies**, 951D Ashwaubenon, Green Bay, WI 54304; Dan or Jay Bottege, (414) 339-8288

**JJ's Dirt Heaven**, 6028 County Road K, Champion, WI 54229; Jim or Jeff Jansen, (414) 866-9096

**Mid-West Tri-Clone**, 3745 Shuster, West Bend, WI 53095; Tom Holz, (414) 334-0429

**NASCAR Raceway**, 4331 E. Wall St., eagle River, WI 54521; Mary O'Brien, (715) 479-5154

**S&N's Trackside Hobbies and Raceway**, 6045 N. Green Bay Ave., Milwaukee, WI 53209; Scott Ernst, (414) 351-1910

**Sparta R/C Raceway**, R&S, Sparta, WI 54656; Eric Johnson, (608) 269-6613

**WYOMING**

**Collectable Creations Off-Road Oval Track**, 1790 Del Range Blvd., Cheyenne, WY 82009; Phil Severson, (307) 632-2156

**ARGENTINA**

**Club A. Velez Sarsfield**, Av. J.B. Justo 9000, C.P. 1408, Buenos Aires; Jorge Herrer, 54-01-658-5851

**AUSTRALIA**

**Aubry R/C Car Club**, Aubry Showgrounds, Aubry, NSW 2640; Ron Langman, 060-247-128

**Canberra Off-Road Model Car Club**, Goyder St., Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070

**Central Coast ORRCC, EDSACC Sports Complex**, Batemay bay, N.S.W. Australia 2261; Peter J Knight, 011-61-43-693-698

**Illawarra RCECC**, Croome Sporting Complex, Alton Park Rail, NSW 2527; Mel or Andrew, 042-714-683

**Lakeside R/C Racing Car Club**, Hollywood Dr., Lansvale, NSW 2166; R. Bartolozzi, 62-9-907-9800

**Northern Districts Model Rally Club, Inc.**, Rear Stanford centre, 16 Stanford Way, Malaga, Western Australia 6066; G. Thirlwell, 61 (9) 249 3855, fax 61 (9) 249 4778; email tony@oios.com.au

**Templestowe Flat Track Racers**, Templestowe Reserve, Corner of Porter St. and Williamson Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625

**Wodonga R/C Car Club**, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 011-6160-247-128

## BELGIUM

**ATR-Alka-Tele-Racing**, 3570 Stationstraat 21, Alken Limburg; 0032-11-25-49-03

**Cartroublies Indoor Buggy Track**, Jan Moonstraat 52-56, 2160 Wommelgem, Belgium; Guy Ermes, 32-3-326-51-15; fax, 32-3-326-51-01

**M.B.V. Parc de Reist**, Tenierslaan, 28, B1910 Kampenhout, Belgium; Frank Mostrey, fax (32) 016657518

**MBV-Kampenhout**, Tenierslaan 28, Kampenhout B1910, Belgium; Frank Mostrey, phone and fax (0) 16-65-75-18

**MRCZ**, Centrum, De Burg, Belgium; Montie, 75-71-63

**Model Racing Club Oudenarde**, Scheldekaert, 9700 Oudenarde, Belgium; A. Chantierie, 32-55-31-36-48; fax, 32-55-30-19-12

**Dynamic Hobbies**, 21 Concourse Gate, Unit 6, Nepean, Ontario K2E7S4; Clark Freeman, (613) 225-9634

**East Coast Model Center Raceway**, 13 Glen Stewart Dr., Suite 1, Southport, Prince Edward Island C1A 8X9; Gary Stephen, (902) 569-3262

**Evolution Speedway**, 1935 Glengrove Rd., Pickering, Ontario L1V 1X3; Eric Lang, (905) 839-2084

**Fast-Trax Speedway**, RR 4, Trenton, Ontario; Russ McPeak, (613) 394-6411

**Jungle Drive**, Rua Alberto Maranhao, No. 219 Icha do Gov. Rio de Janeiro, 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449

**Hobby Center**, SQS 210 B.I.H Apt. 204, Brasilia, DF-Brasil 70.273; 061-242-0488

**NASCAR Raceway**, 4331 E. Wall St., eagle River, WI 54521; Mary O'Brien, (715) 479-5154

**MP Raceway**, AV. Naciones Unidas, 6815 Lapa, Sao Paulo; Gerd Heitrotter, 55-11-9819039

**Off Readers**, Av. Guillermo Dummont Villars, 311, Sao Paulo, CEP 05640-000; Waldir felpo, (055) 011-260-5628; fax (055) 011-831-4931

**Mid-Canada R/C Speedway**, 1678 St. James St., Winnipeg, Manitoba R3H 0L3; Richard Driedger, (204) 339-6566

**Minatures & Passions**, 204 St. Charles, St. Therese, Quebec, Canada J0E 1Z6

2B/2A; Gilles Lachance, (514) 979-7989

**MORRAC Raceway**, 5449 Crowchild Tr. SW, Box 36060, Calgary, Alberta T3E 7C8; (403) 254-1386

**Off-Road R/C Raceway**, 76 Eddystone Ave., North York, Ontario M3N-1H4; Ron Lefebvre, (416) 740-0536

**Prince George Radio Controlled Car Club**, 202 Explorer Cres., Prince George, B.C. Y2M5R8; Doug Waller, (604) 561-0035

**Quintax Speedway**, 810 Dundas St. East, Belleville, Ontario K7K 2M1;

(613) 962-1414; fax (613) 962-7306

**Randy Shank Raceway**, 1015 W. 14th St., North Vancouver, British Columbia; Steve Mulhall, (604) 953-3885

**RC World**, 7070 Haldibrook Rd., RR #1, Caledonia, Ontario N3W 268; Don Nicholls (905) 679-3177 or Keith Seguin (905) 388-9555

**Recreation R/C Raceway**, Hwy 16 and Ferry Ave., Prince George, B.C.; Doug Waller, (604) 561-0035

**Ronbo's R/C Racing**, RR 1 Glen Water, Cornwall, Ontario K6H 3G4; Ron Giroux, (613) 936-0176

**Roussillon Hobby Track**, 177-D St-Jean Baptiste, Chateauquay, Quebec J6K 3B4; (514) 598-2151

**Sheldon's Raceway**, Box 597, Cutknife, Saskatchewan; Sheldon Bradlow, 398-2232

**Spinnin' Wheel Raceway**, RR 1, Ariss, Ontario N0B 1B0; (519) 824-1614

**South Okanagan Roadhogs**, Skaha Lake Rd., Penticton, BC; Willie Lemm, (604) 492-5698

**Strathclair Park**, Old Garden River Rd., Sault Ste. Marie, Ontario P6A 5T1; (705) 759-1855

**Sudbury Organized Auto Racing**, 765 Barrydowne Rd., Sudbury, Ontario P3A 3Z6; Ken Moore, (705) 524-5339

**Thunder Alley Raceway**, Lambton Mall, 1380 London Rd., Sarnia, Ontario N7S 1P8; Rob Smith, (519) 882-3361

**Vancouver R/C Road Racers**, #100-2733 Barney Hwy., Coquitlam, British Columbia V3E1K9; Roger Brown, (604) 945-3888

**COLUMBIA**

**Club De Automodelismo Colombiano**, Centro Recreativo Cafam, Kilometro 14 Autopista Norte, Santa Fe Bogota, D.C. Colombia; Jorge Delgado, 1-6130588

**Club De Automodelismo Colombiano**, Centro Comercial Guaymaral, Kilometro 16 Autopista Norte, Santa Fe Bogota, D.C. Colombia; Jorge Delgado, 1-6130588

**Garoso Raceway**, Avenida Libertadores con Diagonal Gran Colombia, Cucuta, Colombia; Gabriel Rodriguez, 975-751892

**CYPRUS**

**Racing Model Club**, Kennedy Ave. N. 42, Nicosia, Cyprus; Andrea Sotiriou, 493186; fax 493229

**DENMARK**

**Bronby Motor Club**, Roskildevej 460, Roskilde, Denmark 2610; Soren Boy Holst, 011-45-31-472-462

**Holstebro R/C Buggy Club**, Mozartsvej 7500 Holstebro, Denmark 2600; Michael Brusholt, 011-45-97-412-734

**Klub 144 Raceway**, Bagsvaerdvej 144A, 2800 Lyngby, Denmark; Henrik Carstens, 45-42-88-3691

**Rainbow Raceway**, Eriksvej 9, Glostrup, Copenhagen 2600; P. Christiansen, 011-45-52-848-504

**Thor Minirace Odense**, Sohusvej 255, Allsej, Odense, Behind Alessio Hallen (Sport Centre), Odense, Denmark; Ulrich Rasmussen, 011-45-65-303-707

**DOMINICAN REP.**

**Adoca R/C Speedway**, Feria ganadera, Santo Domingo; (809) 220-5266

**La Barranquita R/C International Speedway**, Santiago; (809) 582-2303

**ECUADOR**

**Hobby Centro A.C.R.O. Club**, Via a Turi Km 0.5, Cuenca-Ecuador; Teddy Jaramillo, 593-7-831-289, fax 593-7-817082

**ENGLAND**

**Chessington Radio Car Club**, Surbiton Sport Club, Riverhill Estate, Worcester Park Rd., Worcester Park, Surrey, England; Ian Spiller, 0252-20657

**Hinckley RCCC**, Three Pots Inn, A5 Watling St., Hinckley, Leicestershire, UK; Bruce, 01455-890580

**FRANCE**

**Auto Electron**, 35, rue B. de Ventadour, Limoges, France 87000; M. Boudoul, 55 082763

**Crame Ronc**, 64 rue du Bucquerel, 59370 Mons le Baroeul, France; Michael Hondeykin, (33) 20042755

**Lorgies Bolides**, rue Beau-Riuz, 62840 Lorgies, France; Mme. Hourdequin Sabine

**GERMANY**

**Dreykorn Raceway**, Heuchlinger-Hauptstr. 43, Lau, 91207; Hermann Hensel, 09123-81457

**MC Köln**, Bottgerstr., Worrigen, Germany 50769; Ralf Habel, 02733-477493

**Mini Car Club Dortmund**, Kortschstr. 4, 4600 Dortmund 13, Germany; Roland Schwan, 0231/213609

**Oberhausen-Alstaden**, Am Fesderturm, Oberhausen, Germany 46099; Josef Holt, 028-403676

**Panik Raceway**, Teutonen Str. 5, Jroisdorf, Germany 53844; Guido Kraft, 0224-400259

**GREECE**

**EORA-Fanatix Racing**, 20 Irinis Ave., Pefti, Athens 15121; Mr. T. Diamandakis, 8025556

**GUAM**

**R/C International Raceway**, P.O. Box GK, Agana; Robert (Buddy) Simpkins, (671) 477-3207

**HONDURAS**

**Autodromo Accion**, Quinta Santa Maria, San Pedro Sula, Honduras, Colonia Rivera Hernandez, Eduardo Hondal, (504) 52-2061

**HONG KONG**

**H.K.R.C. Model Car Racing Club**, Lot 2130-2137, Ko Po Tsuen, Sha Tau Kok Rd., N.T., Hong Kong; Alex Chan, (852) 659-2822

**Kingsville Buggy Arena**, Wong Chuk Yeung Village, Shatin, N.T.; Pak Yeung, (852) 607-0828

**INDONESIA**

**Cipaku Indah Speedway**, Jl Cipaku Indah I/2, Bandung 40143, Indonesia; Cipaku Indah Hotel, Brad Lake, 011-62-22-210219

**Everly's Racing**, Palm St., 188, Surabaya, Jatin, Indonesia; Jhon Mudik, 011-62-31-585-888

**Pondok Cabecircut**, Jl. Kunir No. 83, Pondok Cabe, Ciputat, Jakarta, Indonesia; Ali Gus Salim, 7403568-7, fax 7491533

**ISRAEL**

**Ircca Off-Road**, Rahanna, Israel; Yaron Zafiris, (972) 030549937

**Nahsheonat**, Abba Nivel Silver Str. 64, Haifa, Israel 32809; Golan Levy, (972) 039386444 or (972) 04231252

**ITALY**

**Associazione Modellisti Cossato**, via P. Maffei, Cossato 13014, Biella, Italy; Zanelli Romilda, 015-405881; fax 015-922709

**JAPAN**

**Courtney Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674

**Foster R/C Raceway**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; Camp Foster Arts & Crafts, 011-81-61173-53674

**Hansen Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674

**Iwakuni R/C Track**, PSC 561, Box 978, FPO AP 96310-0978; David T. Eck, 011-81-6117-53-3662

**Misawa R/C Raceway**, PSC 76, Box 2946, APO AP 96139-2946; Terry Branchauer, (011) 8117635181 ext. 222-5324

**Yokata R/C Racers**, PSC #78, Box 3619, APO AP 96326, Tokyo, Japan; Victor Giles, 011-81-0425-52-2511 ext. 225-9025

**Zama Off-Road Raceway**, 17th ASGM Unit 45013, Box 3232, APO AP 96338 Japan; SFC Ken Campbell, 011-81-3117-63-8478

**LEBANON**

**Wild Willy RCC**, Oscar St-Jal Eddie, Beirut, Lebanon; 00961-1-403751

**MALAYSIA**

**Titiwangsa Raceway**, Lot 128, Ampang Park, Shopping Centre, Jalan, Ampang, Kuala Lumpur, Malaysia 50450; R.A.C.E. Sdn Bhd., 03-2614496

**MEXICO**

**Alces Off Road**, Lopez Mateos y Rayod S/N, Ensenada, Baja California, BC 22830; Jorge Bustamante, (667) 6-1476, 61477, 86729

**Baja Jr.**, H. Valdez 151 Pte. Y Gmo. Prieto, Los Mochis Sinaloa 81200; Memo Asencio, Gaby Macias, 681-20726; fax, 681-26430

**Club Kyosho de Automodelismo**

**Departino**, Av. Pacifico 216 Coyoacan; Ajusco-Toluca Km 15.3 DE, Mexico 04330, Ing. Jorge Perez Holder, (525) 544-08096; fax, (525) 544-7133

**Hobby Centro**, 12 de Diciembre No. 3070-A, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, (36) 21-46-28

**Hobby's Formula**, Au observatorio 457 DF 01120; (905) 502-3620

**Hobby Model's Raceway**, Blvd. Garcia de Leon, 1555, Morelia, Michoacan 58260; (431) 5-01-22

**Jaguar R/C Club**, Calz. Zavaleta 116, Puebla 72150; Chema, Denise or Chiro, (22) 31-00-91, (22) 33-00-94

**La Hielera**, Prol Corregidora Nte 350, Queretaro, QRO C.P. 76160; Jorge Morelos Rabell, (42) 12-15-25

**Pista Casino**, Hotel Casino de la Selva, Cuernavaca, Morelos 16507; Luis Duhart, (73) 19-12-38

**R/C Racing Club**, Obsidiana #2900, Zapopan, Jalisco 44560; Fernando Hernandez, (3) 616-73-47

**Tony's Track**, Obregon 364 Sur, Culican Sinaloa; Guillermo Prieto, (67) 165708-168141

**NETHERLANDS**

**H.F.C.C. Hollandia**, De Werf 60, The Hague, The Netherlands; G. de Jong, 031-070-3679820

**NEW ZEALAND**

**Capital Model Racers**, Avalon, Lower Hutt, New Zealand; Roger Whitmarsh, 04-566-5714

**Counties R/C Raceway**, Pukekohe Showgrounds, Station Rd., Pukekohe, New Zealand; R. Northcott, 09 23 86904

**Harewood Radio Control Car Club**, 550 Sawyers Arms Rd., Christ Church, New Zealand; Dean Johnson, 09 03 3880 344

**M.A.C. Vlymen**, Hendriklaan 6, Vlymen, Netherlands; Ju Kasteren, 011 31 73 517906

**Papakura Indoor R/C Car Club**, 25 Tainere Cres., Papakura, Auckland; Colin Perry, (09) 298-4711

**Western District R/C Off-Road Car Club**, Cnr Bancroft/Akatea Prive, Auckland; Chris, (09) 838-5201

**NORWAY**

**Aurskog R/C Club**, Aursmoen, 1930 Aurskog, Norway; Tommy Gjeleseth, 47-63-86-21-61

**Dalen Raceway**, P.B. 728, 6401 Molde, Norway; Johnny Reitan, 94 64 52 95

**Hadeland Raceway**, 2750 Gran, Gran Norway; Dag Bakke-Nilssen, 61330405

**Store-Balder Raceway**, 2750 Gran, Gran Norway; Ola Raastad, 61330225

**PHILIPPINES**

**Boyle R/C Hobby Shop**, Unit No. 10 Lucas Commercial Center, Marcos Hwy, Octoberamot, Antipolo, Rizal; Jose "Boy" Chua, 721-2555

**Phillipine F1/Touring Club**, Super Mall I, EDSA, Quezon City 1156; Raymond Aquilar/ Ron Villafior, 896-64-15-23-30-08

**Philippine R/C Association**, B.F. Homes Paranaque, Metro Manila 1700; Ronald/Manny Villafior, 23-30-08  

**Quezon City Radio Control Club**, Quezon City Memorial Cir., Quezon City; Benjie Lumanlan, 731-94-53

**PORTUGAL**

**Aero Clube da Madeira**, Rua do Castanheira E-2, Funchal, Madeira, Portugal; fax 091-221265

**SOUTH AFRICA**

**Banana County R/C Racing Club**, P.O. Box 988, Margate, 4275; Dennis Steemans, 27 (0) 391-20975

**Gordons Bay R/C Club (GBRC)**, Andrew Norman Sports Centre, Gordons Bay, Cape Province; Andre Hollander, 024-512865

**Helderberg Radio Control Car Club**, De Beers Soccer Club, De Beers Ave., Somerset West, Cape Province; Andre Hollander, (024) 51-2865

**Lowveld Radio Control**  
**Thunderdrome**, Lion's Cub Kanyamazene Rd., Nelspruit, Eastern Transvaal; Martin Van Der Merwe, (01311) 534-6415

**Parow Radio Club**, Northern Sports Complex, Parow, Cape Province; Stirling Spangler, (021) 945-4957

**Phoenix Raceway**, 11 Tugela St., Stilfontein, Transvaal; Lionel Edwards, (018) 4842863

**Pietersburg Model Racing**, Landro Marais St., Pietersburg, Northern Transvaal; Peter Van Vuuren, (0152) 293-0700

**R.C. Superhowl**, Elsburg Sports Grounds, Elsburg, Johannesburg; Karl Fawcett, 27119076145

**R.A.C.E. Off Road**, Cecil Payne Stadium, Mariborus, Gauteng; Derrick Plank, (011) 682-2173

**Rustenburg Off-Roaders**, Olympia Stadium, Rustenberg, Northwest Province; Jan Van Vollenhoven, (0142) 24-846

**Pretoria Off Road R/C Club**, Joost Bekker Caravan Park, Octoberville, Pretoria, Gauteng; Gert Swart, (012) 377-3238

**SPAIN**

**ADAM**, Mina Flores de la Sierra, Madrid, Spain; Alvaro Sarabia, 01-7471113

**A.D. Diablicos**, Morata De Jalon, 50.260 Zaragoza, Spain; Juan Carlos Vicente de Vara, 34-76-605350

**Club Modelismo Catilla**, P.O. Box 491, Burgos, Spain 09080; A.J. Pereda, 011-34-47-24-20130

**Club Social Sevillana**, Ctra. Pulianas S/N, Granada, Spain; Oscar Saenz, 958-275282

**Motorclub Castellon R.C.**, Rafalafena, S/N, 12004 Castellon, Spain; Octavio Traver, (34) 64 229705, (34) 64 237411

**Outlaw-Ultima II**, Puerto Rico 27, Madrid, Spain 28016; Juan Vacas, (34) 915197298

**ROARCR**, Naval Station, Rota, Spain (P.O. Box 53, FPO NY, NY 09540-0013); PO Kelly Sexton, 011-34-56-822652

**CRAEM**, La Elipa, Madrid, Spain; Pablo Llorente, 91-3865952

**SWEDEN**

**Amalie Racetrack**, Hjort Vagen 14, 5-46632 Sollentuna, Sweden; Tage Johansson

**PROCAR Speedway**, Industriagatan 8, 430 20 Veddige, Sweden; Lars Nordin, 46-0-340-38784; fax 46-0-340-38694

**SWITZERLAND**

**E.M.B.C.M. Raceway**, Main Street, opposite police station, 8854 Sieben, Switzerland; Markus Schmid, 01-9233621

**ERMC Raceway**, 14 Ch de Taverney, 1218 Grand-Saconnex, Switzerland; M. Maurer, 19-41-22-798-9765

**JMRCV-Terraindu Levant**, Chemin ou Levant, 1290 Versoix, Geneva, Switzerland; M. Maurer, 19-41-22-798-005

**THAILAND**

**Bangkok R/C Spa Huamark**, 16/1 Landprao SOI 96, Wangthonglang, Bangkok, Thailand 10310; M. S. Sanghavas, (662) 931-8390, fax (662) 587-1186

**Radio Control Speedway**, 16 Soi Sua-Yai-Uthit, Rajadapisek Rd., Chatujak, Bangkok 10904; Amornrat, 032-30840-34; fax 032-30840-35

**TURKEY**

**Mosi-Oa-Tunya**, H9619 Highland Harare, Harare Country, Masliland, Zimbabwe; 4623

**B&O DTD Güven Raceway**, Gaziosmanpaşa Sokak Kadıköy, Goztepe Parki, Istanbul, 0216-4186118, or 0216-3490742

**VENEZUELA**

**R/C Mariche**, KM4 Zona Industrial, Del Este Via Mariche, Caracas, DF 1070-A; Bruno Morganti, 58-02-241-3969 or 241-4993

**Santa Paula R/C Club**, Polideportivo de Santa Paula urbanization Santa Paula El Cafetal, Caracas, P.O. Box 66886 Plaza las Americas; Isaac Abecasis 02-2423954 or Franco Agrusa 02-4510314

**WEST INDIES**

**Island Raceway**, 8 Mile Post Jacks Hill, St. Andrew, Jamaica, West Indies; Rodney Littau, (809) 926-7034 or 927-1198

**ZIMBABWE**  
**Mosi-Oa-Tunya**, H9619 Highland Harare, Harare Country, Masliland, Zimbabwe; 4623

**PROLINE**  
**Attention Track Owners!**

Have your track listed in R/C Car Action's Track Directory today! Just fill out form on page 176.  
**Remember, it's free!**

OCTOBER 1996 185

B  
A  
C  
K  
L  
O  
T



### This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035. My internet address is: chris@airage.com.



### The champion's motto:

# practice...focus...relax...win!

I can't begin to tell you how many emails I get that go something like this. "Please Chris, help me! I need to make my car go faster, what do I doooooo?!" or, "Please, I can't take it; just decide for me; which is faster, the Losi or the Associated truck?" I even had one guy email me a list of 20 motors along with a message that said, "I've been stressing for months over which one to buy. Please have mercy and just pick the fastest one for me." Probably the most pathetic message I got said, "Chris—please email me a list of the fastest hop-ups for my Tamiya Mercedes ProMarkt parking-lot racer. I don't care how much I have to spend. I must win. I must have more speed!"

To graphically illustrate the folly of this philosophy, all I need to do is mention the name of our learned associate editor George Gonzalez (left). If ever there was living proof that expensive hop-ups alone won't win races, George is it. George adds everything expensive to his cars. You name it, ole George adds it. And what does George's multicol-



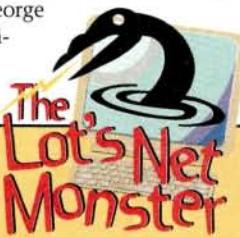
ored anodized, carbon-fiber, titanium, ceramic diff-equipped 1/10-scale rolling treasure-chest racecar get him? Deeper in debt, and deeper into the woods when his car flies off the parking lot out of control.

Look, certain hop-ups do help, but nothing will help if you don't develop solid racing skills. More often than not, it's not the fastest car that wins; it's the car that's driven smoothly and consistently through all the heats. To illustrate the validity of this philosophy, I mention Mario Andretti. Mario's consistently smooth, "Don't break the machine" philosophy is what made him an F1 legend. That's my opinion.

So please, loyal fans of the Lot, give me a break! This "fast—faster—fastest" noise... I-I-I CAN'T TAKE IT ANYMORE!!!

Expensive hop-ups notwithstanding, to win races you need to learn how to focus; the only way to focus is to relax; the only way you can ever relax while competing is to gain confidence; and the only way to gain confidence is to practice.

ALRIIIIIIGHT?!?!



I love most of the opinions in your "Back Lot," but I would just like to question what you said about lengthening the 5-minute races. Where can you get a battery and motor combination that will last longer than that? 1800mAh batteries cost lots of \$\$\$, and if you don't plan to spend that much, that would mean you won't finish a longer race. That just isn't right. But don't get me wrong. I'd just like an answer.

*Kyler or CatSurfr@aol.com  
(under the assumed screen name  
of JB90704—my mom)*

**Y**a know, we could put ultra-hot, 8-turn drag motors in our road racers and no matter which expensive batteries we used, the race would probably last only 2 minutes at the outside. Running 5-minute races isn't about buying expensive batteries that will power the hottest modified motors available for the

required duration. It's about doing the best you can while working within a controlled environment. It's about getting the most out of your car while working within restrictions—in this case, having to go 5 minutes. You can do this by controlling the gearing and the motors used. When geared correctly, a stock or mild modified motor will easily last 5 minutes on a sport battery.

The bottom line is that you have to make your fuel (the battery) last for the duration of the race. That's what class racing is all about. Full-scale racing has all kinds of control parameters and restrictions that racers must follow. Want an excellent example of full-scale racing restrictions? NASCAR has restricter plates on the intake manifolds. Imagine what these guys with their unlimited budgets would come up with if left uncontrolled! Fire-breathing 3,000hp V8s. Think of the "battery" they'd need to power that car for the duration of a race!

CC